Reading Future Create 1

Unit 1. Robot Helpers

Japan has become an aging society. It is estimated that in the next 50 years, the percentage of people over the age of 60 will double, and the percentage of the population over 80 will quadruple[1]. The healthcare issues this will cause are being addressed by artificial intelligence (AI).

AI assistance is now available for such things as medical tracking, diagnosis, and explaining treatments to patients and their families. Additionally, AI can assist with in-home care, such as reminding patients to take their medication and monitoring patients for changes in activity or behavior patterns, to detect potential health issues. They can also detect falls and alert the authorities.

For those who live alone and need daily assistance, robotic helpers like 'Mabu' provide practical help as well as companionship. Not only can it have intelligent, personalized conversations, it can also gather data from the patient about treatment. Such robots give us the additional benefit of doing intensive research in the process of aging, which may further our aim to prevent aging and battle disease.

In preventative medicine, there are now robots which serve as teachers, giving exercise demonstrations to senior citizens.

The International Federation of Robotics said that around the world, about 6.1 million domestic robots were sold in 2017, up 31 percent from the previous year. Robots are widely used not only in workplaces but also in daily life.

Human emotions and rituals are complex; they require computers to process multiple pieces of information at the same time. Emotional territory has long been considered an area into which robots will never venture, except maybe in SF. But more and more, scientists are moving toward this achievement.

[1] quadruple: v. to become four times as big, or to multiply a number or amount by four

Unit 2. Confidence Through Volunteering

Volunteering is the act of doing something strictly in the interests of a community or society as a whole. It is selfless and does not benefit the volunteer directly in any way. Usually, volunteering is done through non-profit organizations. However, it is possible to conduct volunteer activities independently, and anyone is free to do so.

Volunteers are sometimes compensated[2] by organizations for any money they spent helping others. For example, drivers may be repaid for any gas they used driving someone around. Volunteers may also receive other sorts of compensation, in the form of transportation to an event or meals while they are working. But perhaps the most important compensation a volunteer receives is the positive feeling they get from doing something kind and selfless[3].

Some volunteer work is aimed at creating a career, doing such work later helps them find work or go to school. For example, some types of internships are volunteer jobs. Most high schools have a number of service activities and clubs available for students to participate in.

There are a variety of activities to choose from. Some involve doing physical labor, visiting the less fortunate who are in need of company, helping victims following a disaster event, or performing service acts for those in need. There are services for donating blood, helping the elderly, helping children with disabilities, and making and delivering food to the elderly.

Altruism is a belief that one should commit acts that serve the well-being of others. This ideology is one of the reasons for volunteering. However, some people say that altruism alone is not enough to sustain volunteer work.

One good motive for volunteering is that the work makes the life of the volunteer richer. This is the most important motivator. Volunteering, you can socialize and maintain social activities while also helping others.

[2] compensate: v. to pay someone money in exchange for something that has been lost or damaged or for some problem
[3] selfless: adj. caring more for what other people need and want rather than for what you yourself need and want

Unit 3. A National Hero

Terry Fox was named Canada's second greatest Canadian in 2004. He, and his journey and cause are the focus of the Terry Fox marathon, called the "Marathon of Hope."

As a child, Fox played track and field and basketball in high school; his dream was to become a physical education teacher. After entering college in 1977, he lost his right leg to cancer. In 1980, wearing a prosthetic[4] leg, he embarked[5] on a trip that would change the world and the future of cancer research.

On April 12th, the Marathon of Hope began. Fox planned to run daily, starting from St John's, Newfoundland, Canada's easternmost city on the shore of the Atlantic, crossing the whole of Canada, and ending at the Pacific Ocean, in Victoria, British Columbia. He planned this massive adventure in an effort to raise funds for cancer research. His target was 23 million Canadian dollars.

Though his prosthetic leg rubbed and his skin blistered, he got to the end of each day without stopping. He ran close to 26 miles every day. Tragically, after 143 days and 3,339 miles, on September 1st, in Thunder Bay, Ontario, Fox developed an intense cough and was forced to stop. The next day, Fox announced to the world that the cancer had returned, this time in his lungs. He had run his last kilometer.

Fox had raised 1.7 million dollars at that point. However, a week after his marathon ended, a major effort was launched in his name. By the following April, over 23 million dollars had been raised.

Though Fox eventually succumbed[6] to cancer in June of 1981, his legacy lives on. In Canada, his path along the highways is clearly marked, and his spirit is celebrated every year, on the second Sunday after Labor Day. Citizens and students from Canada and other parts of the world now take up his quest to raise funds for cancer research by participating in a non-competitive walk-a-thon[7].

Fox has far surpassed[8] his hope of raising $23 million; estimated donations in the name of Terry Fox now exceed 715 million dollars.

[4] prosthetic: adj. used for replacing a missing body part
[5] embark: v. to go onto a ship
[6] succumb: v. to die or suffer badly from an illness
[7] walk-a-thon: n. a type of community or school fundraiser in which participants raise money by collecting donations or pledges for walking a predetermined distance or course
[8] surpassed: v. to do or be better than

Unit 4. The Boy Who Grew His Hair

Vinny Desautels, a 7-year-old boy, living in California, was teased by others because of his long hair. He was hurt a lot by comments saying he was “like a girl.”

He endured two years of such teasing because he wished to donate his hair to help children fighting cancer. He eventually did get a haircut and donated his 33 centimeters of beautiful, blond hair to Wigs for Kids. However, just a few weeks after the donation, he received some terrible news.

After visiting the hospital because his right eye was swollen, and his knee was sore, doctors discovered a tumor[9] in Vinny’s hips and one near his eye. The diagnosis was stage 4 Ewing’s Sarcoma. Ewing’s sarcoma is a rare cancer found in bone or soft tissue[10]. Advanced Ewing’s, such as Vinny’s, has a survival rate of less than 30 percent. The boy who’d tolerated bullying in order to help others with cancer now found himself drastically ill.

After hearing the heartbreaking news, people all over the world began cheering Vinny on, and a donation website was prepared to help the boy and his family. You can follow Vinny’s journey on Facebook and Twitter. Vinny completed 14 rounds of chemo over 11 months. Presently, doctors have declared him in total remission[11]. Thankfully, he is now cancer free.

[9] tumor: n. a mass of cells in the body that grow faster than usual and can cause illness
[10] tissue: n. the substance that animal and plant cells are made of
[11] remission: n. a period of time when an illness is less severe or is not affecting someone

Unit 5. How to Be a Writer

Blogging is a popular pastime these days. People write about anything and everything on the internet. A lot of people dream of making it big as a writer by having a successful blog. Being a writer seems an ideal job for many people. Writers set their own hours and can work from home or abroad.

However, it is not so easy to succeed. Anyone can create a blog, and therefore, there is a lot of competition. If you want to be a success, you must first attract an audience. Once you have a steady stream of traffic, you can start selling advertising space. But to get to that point, your blog's content needs to be exciting, and your writing needs to be solid. You must have a strong work ethic[12] and dedication to the craft[13].

One benefit of blogging is that there is no need to design your own website from scratch[14]. There are many companies that will host your blog for free and offer promotional services for fees as small as 5 US Dollars per month.

Design your blog with the target audience in mind. Blog postings are most often written in a friendly, freestyle way, rich with expression. They can contain how-to's, opinions, or facts, but whatever your selected content, be sure to present it in a professional, polished manner that is easy to read and structurally sound. Blog posts should be edited for grammar, aesthetical[15] presentation, and ease of reading before being published. Like any other type of writing, revision is key.

It is also important to write interesting, concise titles. The title of each post is what will initially capture the reader's attention in the first place, and draw them in. Determine the subject and perspective of the article, and then summarize it in a catchy, tantalizing[16] way.

To draw readership, use keywords and make sure your blog is available on search engines like Google and Naver. Advertise using social media, and promote yourself as much as you can. The more active you are, the more people will read and recommend your writing.

Most importantly, there should be a creativity that distinguishes it from other blogs. It should represent your personal take on life. Each person has their own unique tone and style, and the way you view your world is different. Authenticity in blogging is the best approach, don't try and sound like somebody else. Celebrate your identity.

[12] work ethic: n. the belief that work is morally good
[13] craft: n. something produced using skill and experience
[14] from scratch: idiom. from the beginning, without using anything that already exists
[15] aesthetical: adj. attractive and artistic
[16] tantalizing: adj. causing excitement, interest, and desire

Unit 6. The Time Machine

Herbert George Wells is one of the most influential figures in science fiction. He is often referred to as the “Father of Science Fiction.” He shares that title alongside Jules Verne and Hugo Gernsback.

Wells was a true intellect, a widely educated man knowledgeable not only in science, but also in education, history, and politics. Wells wrote dozens of novels and short stories in his lifetime. His novels and stories are now considered classics, including titles such as: "The Time Machine," "The War of the Worlds," "The Invisible Man,” and “The Island of Doctor Moreau.” Many have drawn tremendous inspiration from these works of fiction, and Wells’ imaginations have helped change the course of modern science.

Professor Simon J. James, who teaches English literature in Britain, said Wells was "the first scientist in the world to be familiar with novels," and referred to Wells as the first man to dream of a utopia through science.

A time machine is a theoretical[17] invention that can freely move back and forth between the present, the past, and the future. In Wells’ story, “The Time Machine,” the inventor and protagonist travels to the future, arriving in the world in the year 802,701 AD.

There, he finds mankind has evolved into two groups, the Eloi and the Morlocks. The Eloi are a race of delicate beings who are slowly failing due to an abundance[18] of technology, which makes their lives easy and carefree[19]. He later meets the Morlocks, a race who live underground and only come up during the night to feed on the Eloi.

There are dramatic differences between the two races. the Eloi wear clothes, the Morlocks go naked. The Eloi exist off a diet of fruit, The Morlocks subsist main off of the Eloi. The Morlocks work, but the Eloi do not.

The Time Traveler eventually comes to conclude that the Eloi have lost their human drive as a result of facing no challenges in their day to day lives.

Through his fiction, Wells offers commentary[20] on the potential negative impact that heavy reliance on technology may result in.

[17] theoretical: adj. based on the ideas that relate to a subject, not the practical uses of that subject
[18] abundance: n. the situation in which there is more than enough of something
[19] carefree: adj. having no problems or not being worried about anything
[20] commentary: n. a set of written remarks on an event, book, or person that explains its subject or expresses an opinion on it

Unit 7. The Two Faces of Dr. Jekyll

'The Strange Case of Dr. Jekyll and Mr. Hyde' is a novella written by Scottish author Robert Louis Stevenson. It is one of the most famous examples of an 'unreliable narrator' story, which is a device used by authors to add suspense and tension to a narrative. In this tale, the reader eventually discovers that the two characters—Dr. Jekyll and Mr. Hyde—are in fact the same person.

Utterson is Dr. Jekyll's old friend. He is a cold-hearted lawyer. Dr. Jekyll, on the other hand, is well-liked[21] and very sociable. One day, Utterson hears about the horrendous[22] Hyde from a distant relative, Enfield. Dr. Utterson comes to believe that his friend, Dr. Jekyll, is either being threatened by Hyde or that Hyde is going to hurt him.

Meanwhile, Hyde becomes the main suspect in a murder investigation.

As time passes, Dr. Jekyll's behavior degrades, and Utterson finds more and more clues as to Hyde's identity and their linkage[23].

Utterson begins to suspect that Hyde plans on killing Dr. Jekyll, inheriting his legacy, and living in Jekyll's laboratory. Utterson decides to break into Jekyll's lab, where they find Hyde, who seems to have died from taking drugs. Jekyll is nowhere to be seen, but he has left a letter addressed to Utterson.

The letter is a real shock. It explains how Dr. Jekyll had taken drugs which transformed him into the evil Hyde; Jekyll goes on to further describe the conflicts and trials he faced once the drugs wore off and he turned back into himself. He explains that the suicide was the result of wishing to escape his torment[24].

It is a novel that shows the conflict between good and evil that lies within the human mind.

[21] well-liked: adj. liked by many people
[22] horrendous: adj. extremely unpleasant or bad
[23] linkage: n. the existence or forming of connections between things
[24] torment: n. great mental suffering and unhappiness, or great physical pain

Unit 8. The Real Robin Hood?

Robin Hood is a fictitious[25] character originating from a British tale. His story is a part of ancient folklore[26], and his actual origins and real-life existence is still widely debated. There is no doubt a real Robin Hood inspired these adventurous tales, but who he was, when he lived, and what exactly he did, are still unknown.

There is no doubt that the real Robin Hood, whoever he was, is not accurately portrayed by our present-day re-telling of the story. However, as one of folklore's mores enduring heroes, perhaps, in this case, the 'true' story doesn't matter.

The legend of Sherwood Forest's most famous outlaw[27] has historical references as far back as the 15th century. By the 19th century, writers, such as Howard Pyle, popularized the tale, turning it into a children's book, 'The Merry Adventures of Robin Hood of Great Renown in Nottinghamshire.' In it, the chipper Robin Hood recruits the Merry Men, who join him in his mischievous, altruistic[28] quests.

The main antagonist[29] in the legend is an unjust tyrant[30], the Sheriff of Nottingham. He is always trying to capture Robin Hood and his men, and in some iterations[31] of the tale, he is also out to get Hood's 'fair Maid Marian.' Like the figure Robin Hood, there is a lot of speculation[32] about who these characters may be based upon.

The tale of Robin Hood has captured audiences' minds and hearts over the ages. Broadway's first rendition[33] of Robin Hood opened in 1891, and there have been countless books filled with his adventures, as well as dozens of adaptations in film and television, including seven Hollywood movies.

The real Robin Hood may forever remain a mystery, but the legend endures.

[25] fictitious: adj. invented and not true or not existing
[26] folklore: n. the traditional stories and culture of a group of people
[27] outlaw: n. a person who has broken the law and who lives separately from the other parts of society because they want to escape legal punishment
[28] altruistic: adj. showing a wish to help or bring advantages to others, even if it results in disadvantage for yourself
[29] antagonist: n. a person who is strongly opposed to something or someone
[30] tyrant: n. a ruler who has unlimited power over other people, and uses it unfairly and cruelly
[31] iteration: n. the process of doing something again and again
[32] speculation: n. the activity of guessing possible answers to a question without having enough information to be certain
[33] rendition: n. a particular way of performing a song, piece of music, or poem

Unit 9. Living Longer

Increasing the average lifespan by suppressing aging or reversing aging is called life extension. Some scientists are able to reverse the aging phenomenon[34] by using the futuristic stem cells, molecular level cell recovery techniques, and methods to transplant artificial organs or animal organs, and ultimately increase the lifespan of humans.

Boys and girls born in 2018 will live for 70 and 74 years respectively. With advances in medicine and technology, humans dream of a healthy life until they are 100 years old, and scientists who study longevity say there is "no limit to the lifespan of mankind."

In the United States, in Silicon Valley, scientists say "longevity is made, not born." It is found in a variety of studies, including removal of aging cells, genetic manipulation, 3D printing organs, young blood transfusions[35], and telomere extension. Let's take a look at them one by one.

Our body cells are constantly dividing into new cells. As you get older, your aging cells accumulate, and when the immune system is weakened by aging, it causes inflammation[36] and aging in your body. In response, it is conducting clinical tests to remove aging cells on degenerative[37] arthritis[38] patients.

The research is underway to control aging using genetic manipulation, and experiments that increase lifespan through DNA control have already become possible to use animal applications, and only apply to humans.

The development of 3D printing is also being used to extend human lifespan. The experiment was successful in 3D printing human liver tissue or ear to implant it in mice. Scientific journals predict that if the cartilage[39] in the knee breaks in the future, it could be taken to a 3D printer plant instead of a hospital.

Thanks to many medical advances, the average age span keeps climbing, but scientists say that someday, the average life expectancy for humans will likely cap out at around 123 years.

[34] phenomenon: n. something that exists and can be seen, felt, tasted, etc., especially something unusual or interesting
[35] transfusion: n. the process of adding an amount of blood to the body of a person or animal, or the amount of blood itself
[36] inflammation: n. a red, painful, and often swollen area in or on a part of your body
[37] degenerative: adj. gradually getting worse
[38] arthritis: n. a serious condition in which a person's joints become painful, swollen, and stiff
[39] cartilage: n. a type of strong tissue found in humans in the joints and other places such as the nose, throat, and ears

Unit 10. People with Super Taste

Taste is one of five senses. Humans sense taste through their taste buds, located on the surface of the tongue. There are five flavors we can sense: sweet, bitter, sour, salty, and umami (savory). Your tongue has a designated area for detecting each of these flavors.

Humans need a way to distinguish between safe and dangerous foods. Bitter and sour tastes are generally perceived as being unpleasant, while salty and sweet tastes are perceived as pleasant.

While being a supertaster might sound impressive, it can actually be quite difficult. The flavor of everything is amplified[40]; therefore, sugary things will taste too sweet and bitter things, too bitter, etc. For example, skim milk may taste like heavy cream and vegetables are often very bitter and unpleasant to the supertaster.

The upside[41] is that you may be able to make a good living as a food tester, sampling things like cheese, wine, cookies, chocolate, yogurt, or any number of processed foods. Chefs may also benefit from this extraordinary ability, the culinary arts are a competitive field, and super-taste buds could give you a real edge[42].

Interestingly, the American Association of Advanced Studies found that thin people are more likely to have a greater amount of taste buds. Though just because someone is a picky eater does not mean they have a lot of buds. The only way to determine someone's taste capacity is to count the number of taste buds on their tongue.

[40] amplify: v. to increase the size or effect of something
[41] upside: n. the positive part of a situation
[42] edge: n. an advantage

Unit 11. Children's Heights

A rapid increase in height and weight during different development stages is called a growth spurt[43], the first major period of growth occurs in the first year after birth, and the second occurs during adolescence[44].

Growth spurts are triggered by HGH, or human growth hormone, which is secreted from the pituitary gland[45]. In addition to growth, HGH plays an important role in regulating body composition, fluids, metabolism[46], and skeletal development. This hormone is active during childhood and becomes hyperactive in adolescence, triggering puberty.

Girls usually begin puberty[47] two to three years before boys, between ages nine to eleven. Boys 'hit' puberty at thirteen years or older. Puberty for boys and girls lasts about four to five years, though it is often a shorter period of time for girls (two to three years) and a longer, more gradual process for boys.

Many other physical changes take place. As teenagers morph[48] into adults, the shape of their face elongates, and their nose and mouth become larger and wider. The stomach grows bigger because people need to eat more to maintain the body's rapid growth. Blood flow is increased, so blood pressure is elevated.

Balance is temporarily lessened during this period because the body is growing very quickly, and the growth rate of each body part can be slightly different. As the final stages of full growth are approached, people gradually regain full balance over time.

[43] spurt: n. a sudden and brief period of increased activity, effort, or speed
[44] adolescence: n. the period of time in a person's life when they are developing into an adult
[45] pituitary gland: n. a small organ at the bottom of the brain which controls how the body grows and develops by producing hormones
[46] metabolism: n. the chemical and physical processes by which a living thing uses food for energy and growth
[47] puberty: n. the stage in a person's life when the person develops from a child into an adult because of changes in the body that make the person able to have children
[48] morph: v. to change gradually in appearance or form

Unit 12. Your Powerful Lungs

Lungs exchange oxygen between the outside world and our bodies. The lungs take in oxygenated air from the environment and release carbon dioxide. This exchange of gases occurs in an alveolus[49], which is the smallest unit of respiration. The alveolus, or plural, alveoli are tiny air sacs[50] with thin, elastic membranes[51], and our lungs contain approximately 480 million of them.

When we breathe in, our ribs are raised up; this is because our diaphragm—a large torso muscle that separates the chest from the lower part of the body containing the stomach and bowels—contracts and moves downward, toward the abdominal cavity. The chest widens and the expansion of the chest creates a pressure variation, like a vacuum, to pull fresh air in through the airway. This is inhalation[52].

When the ribs and diaphragm relax, the chest cavity is reduced in size, and the air in the alveolus is pushed outward through the airway. This is expiration[53]. This repetition of inhalation and expiration is called breathing.

At birth, our breaths come faster, at 30-60 breaths per minute. As adults, this rate slows, and we usually breathe between 12 and 20 breaths a minute; this is called the 'respiration rate.' While the size people's lungs vary—based on factors such as height and fitness—the average adult male has a lung capacity of about 6 liters. However, we do not fully expel all of our breath with each exhalation, as that would cause our lungs to collapse.

If the lungs do not function properly, people develop respiratory diseases such as asthma, a type of allergic reaction which happens in the lungs. If fluid gets into the lungs, we develop pulmonary edema. This can lead to respiratory distress or cardiac arrest, both of which can be fatal. If you are suffering coughing fits, shortness of breath, or chest pain, you should always visit your local emergency department for a medical assessment.

[49] alveolus: n. one of the many very small air bags in the lungs, with thin walls that allow oxygen to enter the blood
[50] sac: n. a part inside a plant or animal which is like a small bag and contains liquid or air
[51] membrane: n. a thin, soft layer of tissue that covers organs or connects parts of living things, or the outer covering of a cell
[52] inhalation: n. the action of breathing air, smoke, or gas into your lungs
[53] expiration: n. the act or process of releasing air from the lungs through the nose or mouth

Unit 13. Big Data and Math

Big data describes the large volume of data generated in the digital environment which streams into businesses constantly. It is a massive amount of information that is constantly being generated and collected and contains everything from text to video to audio. Compared to the past, the amount of data collection happening has vastly increased, and the variety of data available to analyze helps companies predict people's behavior, opinions, and thoughts through location information and social media.

According to IBM, the daily amount of data produced by humans is about 2.5 quintillion[54] bytes. If you tried to store it on DVDs and stacked those DVDs up, there would be enough to reach from Earth to the Moon.

Big data is also making big changes in transportation and transportation sectors. With a big data infographic incorporating a combination of tables and data, real-time visibility is available to show the movement of people and cargo, allowing for proper, safer transport of goods. Additionally, the fire department can function more efficiently utilizing big data. On average, firefighters have four minutes to prepare between dispatch to an event and arrival at the event. In those four minutes, the more information that pours into them, the better equipped they will be to attend to the situation at hand[55].

While big data is changing many people's lives, healthcare is the area in which it is drawing the most attention. We are always looking for smarter ways to monitor the health of people who are at risk. One of the most innovative ways today is by using artificial intelligence to collect big data.

It is impossible for a doctor to remember each individual's unique situation and circumstances in detail when treating their patients. However, when this information is collected by AI and analyzed, it can be used to better manage patients and their care.

Digital healthcare records play a key role[56] in increasing the quality of care patients receive, emphasizing the importance of big data.

[54] quintillion: n. the number 1 followed by 18 zeros
[55] at hand: idiom. near in time or position
[56] play a key role: phrase. to have a lot of power or influence in a particular situation

Unit 14. The Origin of Measurement

In the Imperial system, the smallest unit of measurement is the inch. 12 inches is equal to one foot, and 3 feet is equal to one yard. 1,760 yards is equal to 1 mile.

In the metric system, the smallest unit of measurement is the centimeter. 100 centimeters is equal to 1 meter, and 1,000 meters is equal to 1 kilometer.

About 90 percent of the world has converted to using the metric system; however, there are a few countries which still employ the Imperial system of measurement, most notably, the United States of America.

This can cause some difficulty, as measurement conversion from Imperial to metric is exceedingly difficult. For example, 1 inch is 2.54 centimeters, and 1 mile is equal to 1.60934 kilometers.

This difficulty in conversion[57] can create some pretty serious mistakes. Many companies from outside of the U.S. deal closely with them in trade and technology. This can end up with people making mistakes which cost millions of dollars. For example, in 1999, NASA lost a 125 million dollar project thanks to one team using metric calculations and another, collaborating team using Imperial. Thanks to this, the Mars Climate Orbiter was sent on a trajectory[58] that brought it too close to the planet, and it was lost.

While the Imperial system may be older, many people still debate its usefulness, especially in comparison to the metric system, which seems far superior in many ways.

[57] conversion: n. the process of converting something from one thing to another
[58] trajectory: n. the curved path that an object follows after it has been thrown or shot into the air

Unit 15. Balance in Nature

Symmetry is a mathematical concept that can often be found in nature. When two or more parts are identical if you flip, slide, or turn them, and they, nonetheless, appear the same, then the object is considered symmetrical.

The simplest form of symmetry, and the most common, is 'reflection symmetry' or 'mirror symmetry;' this is when an object has two sides which are symmetrical. One way to test the symmetry of an object is to hold a mirror up to the middle of the object, dividing it equally in half. If the object looks the same utilizing its reflection to complete the image, it has mirror symmetry. There is also 'rotational symmetry'—for example, a hexagon, and 'point symmetry,' for example, a square.

We see symmetry in nature everywhere—flower petals, snowflakes, honeycombs, butterfly wings, starfish, and more. Why does nature like a symmetrical structure?

Symmetry has very good reasons for occurring in nature. Bees build their hives using hexagons[59] because their structural sound nature will withstand the heaviest winds. For more than 100 years, researchers have known that the way bees build their homes is the most effective, efficient method.

A symmetrical structure is attractive and gives you a sense of stability and balance. Symmetry has played a part in evolution in a major way. Scientists have proven that the more symmetrical a face is, the more attractive we consider it. It is believed that symmetry is a subconscious[60] signal that an individual is healthy and strong. The same considerations are observed in animals.

As symmetrical mates are favored, symmetrical offspring are produced, perpetuating[61] the trait[62]. Therefore, creatures with a symmetrical and orderly[63] structure survived and nature continues to evolve in that direction.

[59] hexagon: n. a flat shape with six straight sides
[60] subconscious: adj. relating to this part of your mind
[61] perpetuate: v. to cause something to continue
[62] trait: n. a particular characteristic that can produce a particular type of behavior
[63] orderly: adj. well arranged or organized

Unit 16. Probability

Probability is a method of expressing knowledge or belief about whether or not an event will occur and expressed as a ratio at which a particular result will be produced from the same cause. Probability is being used in various fields such as mathematics, statistics, accounting, gambling, science, and philosophy.

Probability is also the predicted rate at which a particular event will likely occur as applied to individual cases or sets of circumstances.

When you throw a six-sided die, the probability that a particular number will come out is 1/6. In Lotto, the total number of tickets is 8,145,060, therefore, if you buy one ticket, the probability of winning is 1/ 8,145,060. The probability of winning with two different tickets would be 2/8,145,060, and so on.

Usually, rather than showing probability as a fraction[64], it is shown as a percentage between 0 and 100.

If two friends play rock, paper, and scissors, the odds are as follows:

The probability that A will win is 3/9 = 1/3, or 33.33 percent.
The probability that B will win is 3/9 = 1/3, or 33.33 percent.
The probability that they will tie is 3/9 = 1/3, or 33.33 percent.

The total number of cases is 9.

The list of 9 cases is as follows:

1. rock/rock, 2. rock/scissors, 3. rock/paper
4. paper/paper, 5. paper/scissors, 6. paper/rock
7. scissors/scissors, 8. scissors/paper, 9. scissors/rock

While probability is calculable, that does not mean that it is 100 percent reliable. You can calculate a likely[65] outcome, but that doesn't mean you always have 100% certainty. Rock, paper, scissors is a simple example, but many situations have too many variables, and so probability serves only as a guiding, best guess.

[64] fraction: n. a number that results from dividing one whole number by another
[65] likely: adj. expected to happen; probable