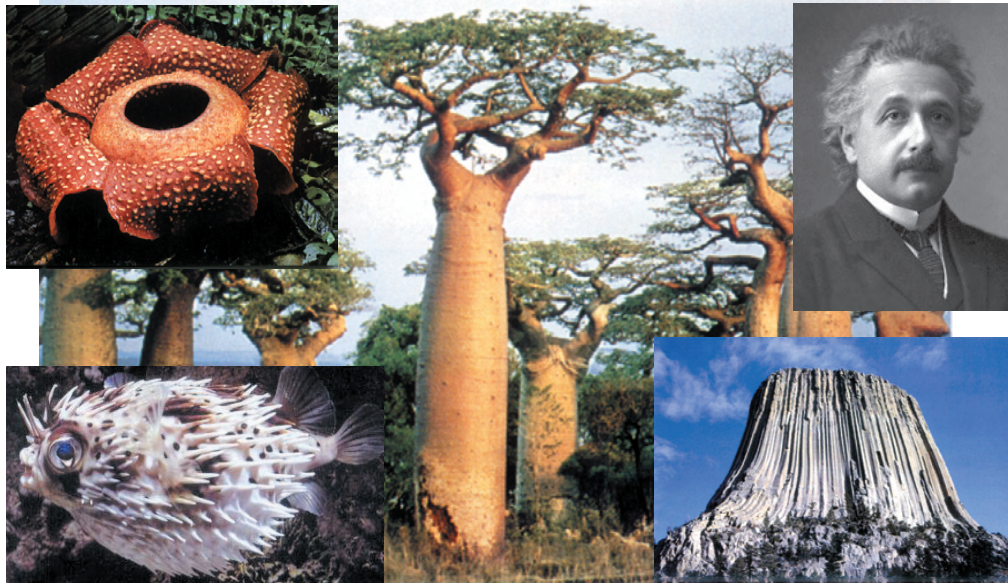




07 Marvels of the environment



By the end of this chapter you will be competent to...

- appreciate the wonderful characters among the plants and animals we come across in day to day life.
- appreciate the magnificent objects and phenomena on the earth and the space that we live in.
- investigate the wonderful creations made by people.
- appreciate the work of great scientists who bestowed excellent creations to the world.

7.1 Plants that exhibit wonderful characters

Every plant is an extraordinary plant! That is because each and every plant has its own special features. Plants are everywhere. From the lush vegetation of tropical rainforests to the Arctic Tundra in the north-pole, the whole world is cloaked in a mosaic of vegetation.

Plants can be classified as trees-shrubs-herbs etc, or meso-phytic-xerophytic-sea-shore-aquatic-mangrove-epiphytic or various other classifications.

And wherever the plants grow, how they grow is linked to the climate. As a result of living in those habitats for millions of years, plants show various adaptations to overcome the difficult conditions of their environment as well as to gain a lot of advantages over them.

The result is a kingdom of plants having fantastic shapes and structures, with many innovative mechanisms for survival.

❖ Water pot of Nature.....(Baobab)



7.1 - Baobab tree- *Adansonia digitata*

Plants which grow in places where prolonged dry seasons persist, have wonderful adaptations to store water. Baobab tree which grows in Senegal, west of Africa, is a good example. This tree has a trunk with dimensions of up to a maximum circumference of nine metres and a maximum height of eighteen metres. During

rainy season the soft, white fibrous stem fills in and stores about 100000 litres of water. This water is important for the tree to thrive through the six month long dry season.

A group of twisted branches are attached to the top end of the trunk. They shed their leaves in the dry season and grow again in the rainy season. But before the leaves start to grow, flowers bloom. Flowers open at night. They are large and white.

Baobab is an important plant. In the past, people have quenched their thirst by stored water in the trunk of this plant. The fruit of Baobab is like a **gourd**. It is high in Vitamin C. Leaves are a delicious vegetable. Ropes are made out of the fibre in the trunk.

❖ **Giant Tower..... (Redwood)**



7.2 - Giant redwood tree
Sequoiadendron giganteum

World's largest individual organism is the Californian redwood tree. It is a majestic evergreen tree with a reddish-brown trunk. Trees having a girth of 24 metres and a height of 120 metres have been reported.

These trees are abundant in the Redwood Creek Valley in the north-western coast of North America. It is believed that the lifetime of redwood trees are about 2400-4000 years. According to estimates the average weight of a tree is 2000 tons. It's difficult to destroy the trunk of the tree by fire or by insects.

❖ **Even though it stinksthe largest flower in the world (Rafflesia)**



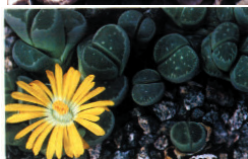
7.3 - Rafflesia flower -
Rafflesia arnoldii

Rafflesia, with a diameter of 90 centimetres is the largest flower in the world that is found in Indonesia and Malaysia. Parasitic on woody vines, Rafflesia plant donates this magnificent flower to the environment. It has five petals.

The smell given out from it resembles the smell of rotten meat. Colour and appearance of the flower being similar to a chunk of rotting meat is another speciality. Insects such as flies

that are fond of bad smells get attracted to these flowers. They pollinate the flowers.

❖ What's this ? A tree.....or a stone (Stone plants)



7.4 -Stone plants -
Lithops

Stone plants grow among other pebbles in South African deserts.

These look like colored stones. It's very difficult to differentiate them from the surrounding pebbles.

These plants are capable of maintaining the shape and form of pebbles as they possess highly fleshy solid stems and leaves are limited to one to three pairs.

Flower is larger than the plant. Cluster of slender petals have glistening colours. These plants could be differentiated from the desert soil during the flowering season.

❖ Selfish plant that depend on others (Cuscuta)



7.5 -Cuscuta -
Cuscuta chinensis

It's a vine that grows entangled like a mess of yellow thread on bushes. This is a non photosynthetic parasitic plant. The root produced by the germinating seed attaches to a soft stem of another plant. Roots penetrate into the stem and obtain all its nourishment from the plant.

There are instances where the host plant has died off. Then Cuscuta will also die off unless it invades another host plant.

❖ Fruit which propells with it's wings..... (Hora)



7.6 -Hora -
Dipterocarpus zeylanicus

Found in the wet zone of Sri Lanka, Hora tree is an endemic plant with an erect trunk, which grows up to about 30 metres high. Flower possesses two large sepals. During the formation of fruit, sepals do not fall off, but persist in the fruit, as well.

The fruit is dispersed to far away places by rotating on its own axis, with the aid of its two sepals, as it is released from the tree.

❖ **Snake born to a bush..... (Tiger claw)**



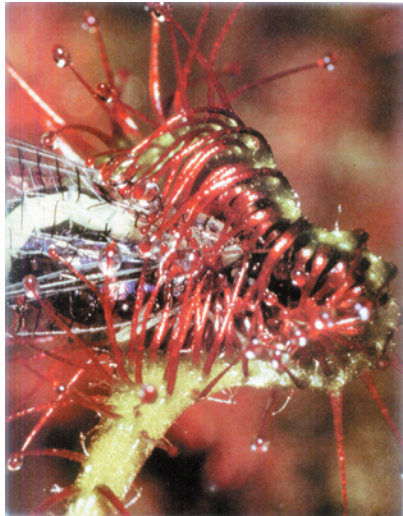
7.7 -Tiger claw
Martynia annua

Found in the dry zone of Sri Lanka. Fruit of the Tiger claw plant is hard when dried.

Deep black in color. Possess a pair of sharp hooks similar to the head of a snake.

Fruits get attached to the body of animals with the aid of sharp hooks. This helps in its dispersal.

❖ **Traps animalswith false tears (Sundew)**



7.8 -Sundew - *Drosera indica*

Present in acidic, marshy soils in almost every country of the world. A cluster of hairs are seen on the upper surface of the leaves of the sundew plants. The glands at the end of these hairs, are in effect multipurpose factories.

These glands secrete glistening droplets of liquid which appear as small jewels or tear drops.

The liquid droplets are colorless and odourless and appear like nectar. Highly adhesive. Insects get attracted as it resembles nectar. When they try

to escape, these get entangled in the adjoining droplets and die.

The droplets secreted by the glands contain enzymes. Therefore, the digestion and absorption of the dead insect occurs within these hairs.

7.2 Animals that exhibit wonderful characters

You, as a human being, are one of the animals in the animal world. Animal kingdom consists of about 1.5 million known, immensely wide variety of amazing animals. These animals show various forms of movements like walking, swimming, flying, gliding and crawling.

The sizes of animals range from minute creatures to gigantic elephants and whales. Each and every animal has a body adapted to survive in the natural environment they inhabit.

Among all animals the group ‘insects’ are the most successful inhabitants of the environment. Naturalists have only identified and named a million of the estimated three million insect types.

We can find a lot of amazing animals which are adapted to gain special advantages such as; to overcome the challenges of their environment successfully, to protect from enemies and to catch prey easily.

❖ Squirrel capable of flying..... (Flying squirrel)



7.9 -Flying squirrel
Glaucomys volans

A rodent capable of gliding from upper branches to lower branches by means of a blanket like membrane of furry skin stretched between its long forelegs and hind legs.

Flying squirrels have large eyes, dense soft fur, and long flattened tails, which are used to guide their parachute like glides from tree to tree.

Long nails help it to grab a tree. Sri Lankan flying squirrel is an endemic animal.

Asian giant flying squirrels can glide distances up to about 450 metres.

❖ **Face hidden barbed wire roll (Pangolin)**



7.10-Pangolin - *Manis pentadactyla*

Pangolin looks more like some prehistoric reptile than a mammal. Tail accounts for a larger part of its body length.

Pangolins range from about 65 centimetres to two metres in length. Most of them are nocturnal whereas some are diurnal. Some are arboreal and others are terrestrial.

When they are asleep or scared they roll like a ball and its scales standing erect, is a form of strategy for its security. The edges of the scales are sharp like metal strips. Females roll together with their young. They are toothless.

Their long sticky tongues are used to catch insects and termites. Fore limbs with rake like nails help them to find insects and termites.

❖ **Fierce python emerging through water (Anaconda)**



7.11-Anaconda - *Eunectes murinus*

Anaconda is the longest, heaviest and strongest of all the serpents in the world. It inhabits the northern parts of South America and the Amazonian river systems.

Longest reported Anaconda is 10 metres in length. It weighed 250 kilograms. It is a carnivore which constricts and swallows the prey.

❖ **Swimming electric shock..... (Electric eel)**

Even though it appears to be an eel, or named as electric eel, this animal is not a true eel.

It is a South American fish which grows up to about 2.5 metres in length. About four-fifths of its total length is tail. This tail is a special tail. It is capable of emitting an electric current amounting to about 600 volts.



7.12.-Electric eel -
Electrophorus electricus

That's why it is called the electric eel. Do you know that your house is supplied with an electric current of only 230 volts.

Electric eel uses this strategy to stun their prey while hunting; they are also emitted in self-defence. But this electric discharge lasts for about two-two thousandth of a second.

❖ Mammal born of an egg..... (Duckbilled platypus)



7.13 -Duckbilled platypus
Ornithorhynchus anatinus

Duck billed platypus; Snout like a bill of a duck, webbed feet, an animal whose body is covered with thick-silky-blackish-brown fur.

It is a rare kind of an egg-laying mammal which dashes away as it sees us. Length of the body is shorter than half a metre. Snout occupies about six centimetres of it. Duck bill is used to snatch prey, foraging the riverbed for worms, clams, insects etc.

Even though it possess very small eyes and the ears are not visible, duck billed platypus has a sharp vision and high auditory capability. Its homelands are Australia and Tasmania.

❖ Tiny fan which blows to flowers...(Bee Hummingbird)



7.14 -Bee Hummingbird
Mellisuga helenae

World's smallest bird is bee hummingbird. Five centimetres in length and weighing less than a gram, it is an inhabitant of Cuba.

The bee hummingbird beats its wings 80 times per second, and it is like a small turning top. Because of this vibrant beating of wings, they are capable of being stationery in space at once and flying in reverse direction; which is an amazing and unique ability only of humming birds.

They lay two white small eggs in cup shaped nests, which are made out of spider webs and fib like parts of trees, on the twigs.

❖ Giant of all giants..... (Blue whale)



7.15 -Blue whale -
Balaenoptera musculus

Largest whale and the largest living creature on Earth. Weighing up to 150 tons and more than 24 metres in length, it is under threat of extinction.

It is called blue whale because its skin has a light-grey-and-white mottled pattern, which appears light blue when the whale is just below the surface of the water on a sunny day. Females give birth to a single young once every two or three years. They produce loud, low-frequency moans to communicate between each other. This sound travels over thousands of kilometres underwater, across a vast expanse of ocean.

Blue whales feed by lunging open-mouthed into dense groups of small sea creatures such as krill or fish. Amount of food taken in a meal is around two thousand kilograms.

❖ A porcupine amidst fish..... (Porcupine fish)



7.16 -Porcupine fish -
Diodon hystrix

Porcupine fish a kind of fish which inhabits coral reefs, is covered with a mass of strong bony spines having the color similar to its skin. These spines are poisonous. Wounds caused by these spines take a long time to heal.

The teeth are fused, producing a beaklike mouth. In the face of danger, it may swallow water or air, inflating the body to about thrice its normal size. Then it appears like a floating *Durion* fruit.

Porcupine fish is about 70 centimetres in length. It feeds on corals and other soft animals.

7.3 Marvels of Earth and Space

Our physical environment is a combination of land, water and space. We come across objects and phenomena related to the environment which are unique and marvellous. We can discover such objects and phenomena through formal scientific explorations but there is nothing hidden or mysterious when seen on a scientific basis.

However, it would be enjoyable for you to study about the marvels related to the environment.

❖ Marvels related to land..... (The Devil's Tower)

The picture illustrates the amazing Devil's Tower which is 390 metres tall. It is the United States first national monument. It uncovers information of an active volcano fifty million years ago. It is considered as an upper end of a pipe of an active volcano which ejects lava formed by molten basalt inside the Earth.



7.17 -Devils Tower-USA

This huge stone tower has been constructed as the lava slowly cooled and solidified forming a collection of pillars, hexagonal in cross section.

❖ San Andreas fault.....

A fault on the surface of the Earth could be seen in California, from the Imperial Valley to Point Arena stretching for 1000 km.



7.18-San Andreas fault

This is a plate boundary of the Earth. North American plate and Pacific plate are beside this. These plates slide past each other two and a half centimetres per year. Violent earthquakes and volcanoes occur in these plate boundaries.

❖ Meteor Crater.....



7.19 -Meteor Crater

Winslow area of the state of Arizona of North America, is an excellent example to illustrate the formation of a crater by a fallen meteorite. It is believed that this meteorite would have fallen 50,000 years ago and the estimated diameter is 50 metres. The large crater formed due to the impact was 1.2 kilometres in diameter and 180 metres deep.

❖ Marvels related to water.....Dead Sea



7.20 -Dead Sea

Dead Sea does not drown you. You can float upwards on it and have a look around. It is a reservoir located at 408 metres below sea level, 399 metres deep, surrounded by high lands. It has saline water having a concentration seven times higher than normal sea water and is devoid of any plant or an animal.

Dead Sea is amidst Israel and Jordan. The only way-out for the water that flows from the Jordan River to the Dead Sea is through evaporation to the atmosphere. But, its salt concentration is a good indication as to what great extent evaporation takes place.

❖ Geyser



7.21--Geyser

Groundwater trickles down towards a magma chamber - a body of cooling molten rock boiling, and becoming steam, forces it back up to the surface with immense force.

This is called a geyser. Geyser gushes from time to time. There are instances where a geyser gushes from one metre to 100 metres. All the famous geysers are located in New Zealand, Iceland and United States of America.

❖ Great Barrier Reef



7.22 -Great Barrier Reef

Great Barrier Reef located off the northeastern coast of Australia bordering the Pacific Ocean is the largest construction ever made by a certain group of organisms.

It has been constructed by coral animals having a simple body structure, over thousands of years. The reef extending to about 2010 km consist of 3000 single corals and about 300 small coral islands, is virtually a huge coral complex.

❖ Blowhole

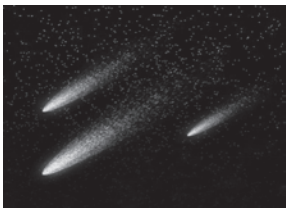


7.23 -Blowhole

Blowhole is a fountain of water gushing up to the sky with a booming sound. This amazing sight could be seen in Dikwella, in the Southern coast of Sri Lanka.

During monsoon this blowhole rises up to twelve metres, creating a rainbow nearby. High speed water gushing from the sea currents through a narrow gap between the large stone structures along the seashore generates pressure and creating a spray of water to the sky as a column of droplets. According to the available records it's only second to the '**Kiama**' of New South Wales, Australia, which rises up to twenty five metres.

❖ Marvels related to space.... Shooting stars



7.24 -Shooting stars

There are instances where rocks which roam around the sun, the planets and their moons are being attracted to Earth at once. The reason is that they enter the orbit of the Earth.

On entering the atmosphere, they catch fire and burn to ashes. As they catch fire, they light up their path and create an amazing sight.

That's how a meteorite appears. Sometimes, there are instances where rains of meteorites fall off.

❖ **Mirage.....**



7.25 -Mirage

What you see is not a fortress made in the sky. It's a mirage that could be seen in the very cold North Sea in Germany.

This optical illusion is formed when light traverses through the heated air stratum near the sea and the cold air stratum above it. This is called the 'False Promise'.

❖ **Halo.....**



7.26 - Halo

It is a rare occasion, where a special kind of halo far away from the sun could be seen in this illustration. This is a very attractive rainbow with circular rings. Innermost is the red colored ring. Outer limiting ring is violet.

These rings are formed from the diffracting light through the clouds made up of ice crystals high up in the sky between 6000 – 10000 metres from the Earth. There are instances where this kind of halo could be seen around the moon too.

❖ **Blue sky....**



7.27 -Blue sky

Why does the sky appear blue unless it is disturbed by the clouds?

Sun's rays are made up of a mixture of seven colors. It is apparent in the rainbow.

Oxygen (O_2) and Nitrogen(N_2) occupy not less than 98% of the gases in the air. Blue light in the sun's rays are scattered when it hits those gases.

Then this blue light approaches your eyes. Look into the sky. It's blue.

7.4 Great men and great creations

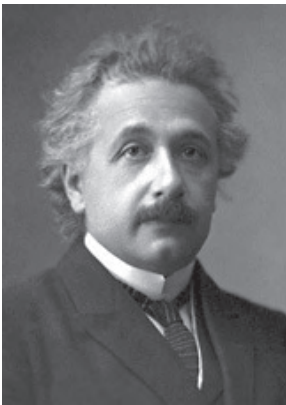
Water bird's nest is spectacular. But it still constructs the same old nest which it built thousands of years ago.

Being a human you are a brilliant animal. Humans through their intelligence, develops what he created yesterday into an amazing creation for tomorrow. We enjoy a wide range of benefits from the discoveries of the great scientists through their painstaking efforts and enormous courage.

We will discuss some creations and discoveries that have contributed to change the world, as well as the scientists that have contributed to the development of science.

7.4.1 Great Scientists

❖ Sir Albert Einstein (1879 - 1955)



7.28 -Sir Albert Einstein

Albert Einstein was born with a great hidden wisdom at Ulm, Germany in 1879. But the Little Einstein's classroom failed to vitalize his wisdom. He was therefore, just another student among other students for his teachers. His intelligence won at last.

That was a victory to all humans. Einstein through his innate intelligence improved his thinking process sharply. He was able to see through the universe. He discovered theories related to gravitation, space and time to a depth that any other human being could not imagine.

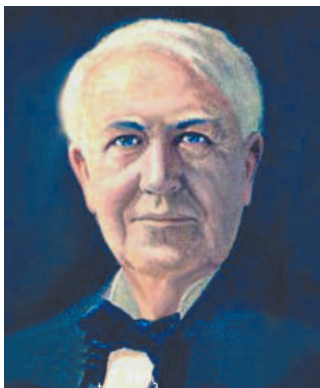
The observations made at a later stage revealed that Einstein's discoveries are extremely accurate. Thus, a scientist who made a remarkable revolution in Physics was created out of Einstein.

His discoveries

- How all objects are held by the universe.
- Bundles of light called 'photons'

- Conversion of matter(solids, liquids and gases) into energy (This is the principle used in the atomic bomb and nuclear energy)
- Light shining on metals sometimes causes electricity to flow

❖ **Thomas Alva Edison.....(1847-1931)**



7.29-Thomas Alva Edison

Thomas Alva Edison is an American national, one of the greatest inventors of all time. He was noted among others for having a comparatively large head with an excessively broad forehead. With the invention of incandescent filament electric bulb, he made a new path in the human history.

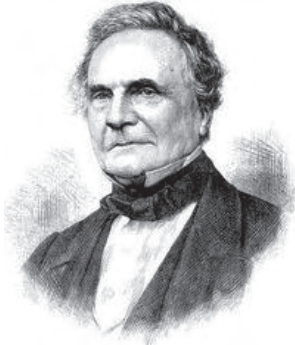
The courageous effort and determination made in inventing the light bulb tells the world a story of a great man. He has more than 1000 inventions to his credit. This gives evidence for his tremendous ability to make innovations, which a normal person cannot achieve.

School life of this great inventor lasted only for three months. He was branded as a hyperactive child. The cautious mind he possessed in his childhood may have been the reason for it. In the end, his mother taught him at home.

Some of his inventions are:

- Vote-recording machine
- Research laboratory in Menlo Park, New Jersey
- Phonograph
- Practical incandescent electric light bulb
- Provided electricity, generated by a central power station, to New York City.
- Discovered that incandescent materials emit electrons. This phenomenon is known as the Edison effect or thermionic emission.
- Kinetoscope
- Talking motion pictures

❖ Charles Babbage..... (1791-1871)



7.30-Charles Babbage

Charles Babbage is the father of the computer. He was a British mathematician. He was the inventor who designed and built mechanical computing machines which led to the invention of modern computer, responsible for the tremendous technological advancement the world has gained.

Due attention was not paid by the scientists for his work at that time. The development of difference machine, invented by him was also abandoned half way through due to lack of funds and was collecting dust in the Kings College Museum.

Even though he died, his difference machine didn't. Find out how it developed day by day, enlightened and rejuvenated by the intelligence of scientists, through the present to the future. At a later stage with the aid of descriptive drawings and information of Babbage, the difference machine was completed.

This magnificent machine was able to make simple calculations ranging up to 31 digits accurately.

Anyhow, thirty seven years after the death of Charles Babbage, his brain preserved in alcohol was dissected. Biologists who performed the dissection discovered the message that difference machine gave was true. That Charles Babbage was a great thinker.

Some of the inventions are:

- Cowcatcher of the railway
- Dynamometer
- Standard railroad gauge
- Uniform postal rates
- Occulting lights for lighthouses
- Greenwich time signals
- Heliograph opthalmoscope

❖ Sir Isaac Newton (1642-1727)



7.31- Sir Isaac Newton

A Physist, mathematician as well as a philosopher, Sir Isaac Newton was an all time scientist. He always tried to explain the behaviour of objects from a mathematical background.

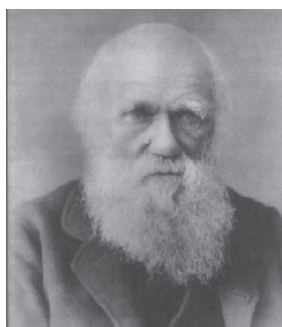
He imagined how the moon travelled along an orbit around the earth. He thought of an apple falling off from a tree and assumed that there is an attraction of the apple to the earth, moon too has to have a similar attraction to the earth. At a time when no one had ever thought of earth's gravitational force, this great scientist discovered it and published his findings very accurately.

Newton as a student enjoyed constructing various things, apart from his classroom activities. Solar discs, model of windmill, water clock, trolley are some creations which caught his interest. Even though he was a very silent character he enjoyed flying kites attached with lanterns in his spare time.

His major discoveries

- Laws of gravitation and motion
- Behaviour of light when travelling through various media
- First reflection telescope
- Certain areas of mathematics

❖ Sir Charles Darwin (1809-1882)



7.32-Sir Charles Darwin

Because of the discoveries of the British naturalist, Charles Darwin, the strong beliefs about the presence of organisms on earth had to be viewed from another point.

Being a brilliant naturalist, there was a sharp observer within him. Through his observation skills he was capable of presenting the patterns of relationships that exist among organisms as well as the organisms and their environment.

Born to a wealthy family, Darwin's intention was to study medicine and be a doctor. Later he dropped the idea of being a doctor and studied religion well, as preparation to be a clergyman.

This period of time, being an important milestone in his life, he came to know as a geologist and a naturalist. In 1831, Darwin was taken aboard the English survey ship *HMS Beagle*, as a volunteer scientist which was fortunate for all of us. Interesting information collected regarding the environment and organisms, during the five year long expedition around the world, helped him to change history.

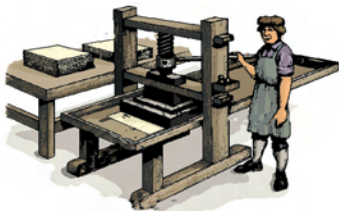
His major discoveries

- Organisms produce large numbers of new organisms. (over production)
- New borns differ in characters. (Variations)
- There arise a competition for needs like food, water and shelter (Competition)
- In the competition among the different kinds of organisms, only the stronger individuals win (Survival of the fittest)

7.4.2 Great inventions



7.33-Johannes Gutenberg



7.34 -Gutenberg's press

❖ Printing Machine

How lethargic would a world be in which all the material has to be written and filed? Communication was accelerated with the advent of the printing machine. In about 1450, a German named Johannes Gutenberg contributed his technological know how to the society through this creation.

During the past millennium, no other creation has contributed so much for the development of science as well as arts. It gave the opportunity for the people to communicate what they have discovered in their environments to the whole world.

Printing machine has made a gigantic contribution towards the rapid development of humankind.



7.35 -James Watt

❖ Steam Engine

How much of muscular energy of humans and animals would have been consumed for the constructions of the Pyramids of Egypt and Great Wall of China? Man had tried to use various strategies to conquer the world, restricted within the limits of human or animal labor before and after those periods.



7.36 -Steam engine

With the invention of the steam engine by the British inventor James Watt, in 1769 man took a great leap to the world of technology, beyond the limits of human or animal labor. Steam engine made a revolutionary change in the technical world introducing the wonderful vehicle, the train.

What is the technology behind this?

The wheels of the engine are being rotated through a system of pistons which are powered by the high pressure steam generated by boiling water in a large boiler. Earlier fuel wood and later coal was used as fuel. Rail transport made an invaluable impact on the industrial revolution. It provided an efficient service for transporting all the necessary materials to the appropriate places needed for manufacture. Various other development works using the technology of the steam engine were also initiated soon after. Later, steam power was used to generate electricity.

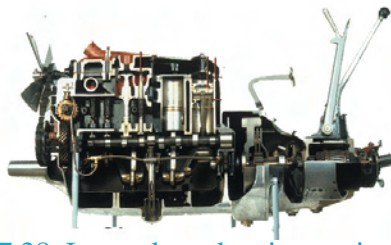


7.37 -Nicholaus A Otto

❖ Internal Combustion Engine

The energy is produced by the combustion of fuel in a closed chamber. At first petrol, then diesel and at a later stage gas has been used as the internal combustion engine developed up to the present day.

Just imagine a steam engine which carries a large amount of coal and a huge water tank.



7.38 -Internal combustion engine

It is easy to operate a vehicle having a small fuel tank and an internal combustion engine. High efficiency of the internal combustion engine is the greatest feature.

That is the reason for the development of various vehicles

which can travel along a common road and transport people and goods. Man therefore with less effort take the opportunity to travel along the road of technology. From the motor cycle which is limited to a small street, to the spaceship that travel beyond the Earth, man has achieved the auspices of the internal combustion engine. Thousands of machinery which are derivatives of this technology are being developed.

❖ Computer

Why do you use a computer?



7.39 -A modern computer

Because, it is an excellent tool which can perform a wide variety of functions with great reliability, accuracy and instantly. A computer does a lot of things which human labor cannot perform instantly such as storing a large amount of data, processing and analyzing, calculating, transforming into other information.

Computers can edit and construct from a dot, a line up to complex multiple, three dimensional plans, live animations, film scenes and addition of various parts according to your wish.

Computers perform with ease and efficiency the difficult tasks which cannot be performed efficiently even with the contribution of a number of people such as the procedures of a power stations, telephone network coordination, production processes in factories, monitoring security systems etc.

Computers contribute greatly to education by providing higher technological background through the production of learning resources and a live audio-visual media presenting an enjoyable learning environment.

Computers provide open access to the infinite universe through Internet and E-mail. Produced under the auspices of human intelligence and persisting under the control of humans, computers have gained the status of managing the world.



Assignment

Mentioned below are some Sri Lankan Scientists who did very important inventions for the mankind.

- ✧ Mr. D.J. Wimalasurendra ✧ Dr. A.N.S. Kulasinghe
- ✧ Prof. Cyril Ponnampereuma ✧ Dr. Arthur C. Clarke

Prepare a book-let mentioning the service rendered to the society, through their inventions.



Exercise

Are you a scientist? Or an inventor? It's up to you to decide. Can you take the challenge of doing the tasks given below?

- Supplying water to a crop in a large plot of land efficiently.
- Uncovering the story of a sand particle or a pebble
- Protecting the monuments made out of stone in the face of an acid rain threat
- Making an instrument to slice leafy vegetables finely and efficiently
- Removal of oil drained into a reservoir
- Discovering the interesting characters of plants/animals found in the home garden through scientific investigation
- Effective use of discarded plastic containers or curd pots
- Conducting a scientific study on the harmful ingredients contained in the food items in the market and their ill effects
- Investigation of how the body plan and behavior of elephants complement with its lifestyle
- Making dyes, adhesives and purifying agents using various materials.