

**Chronology of Universe**

**Universe in a Week**

**Chronology of Earth**

**Earth in a Week**

**Religion in a Week**

**Extinction of Species**

**Aliens and Us**

**Curriculum of Education**

A perennial question that keeps getting asked is, “How, and why, are we here?” The “why” part does not have a satisfactory, scientific answer yet, but the “how” part has a partial answer at least. The theory is that the universe started 13.8 billion years ago from a tiny primordial entity that exploded with a “big bang.” Ever since then, it has been expanding. Within its bounds, there have formed stars and planets, with the planets revolving around their respective stars. At least, one of those billions of planets has managed to create life, and so that is how we are here.

It has taken lots of stages of development to get to where we are today. The chronology of development is readily available on the Internet, so we need not delve into details here.

What strikes me as amazing is the time it took after the “big bang” for the sun to appear, as well as the length of time when the earth was devoid of any life at all. The length of time of barren existence of the earth is mindboggling. The sun and the earth were created or formed nine billion years after the universe was born! That was a lot of time. Again, the first living things inhabiting the earth came about only 2 billion years ago. That is more than 2 billion years after the earth was formed. Two billion years of life-less earth is, to my mind, pathetic.

When a self-sustaining and self-replicating cell came along, it was a near miracle. But it stayed that way for a billion or more years before it could achieve the level of multi-cellular animal. Then that simple animal evolved through the fish stage and reptile stage to mammal in another billion years. We humans made it to this stage from simple mammals in a time of 100 million years. Time just rolled by. Evolution was a very, very slow process.

The following chart is a short outline of the development the universe went through. We can look at this time from one of two vantage points: Counting time from the start (Big Bang) or counting back from where we are today.

Table 1

Event	Since Creation	Counting Back in Time
Big Bang	0 time	$13.8 \times 10^9$ years ago
Stars begin shining	$0.5 \times 10^9$	$13.3 \times 10^9$ years ago
Milky Way cloud forms	$1.2 \times 10^9$	$12.6 \times 10^9$ years ago
Milky Way spiral galaxy	$7.3 \times 10^9$	$6.5 \times 10^9$ years ago
Sun (formed from remains of supernova)	$9.23 \times 10^9$	$4.57 \times 10^9$ years ago
Proto earth	$9.24 \times 10^9$	$4.56 \times 10^9$ years ago
Moon (formed from debris of collision with planetoid)	$9.27 \times 10^9$	$4.53 \times 10^9$ years ago
Life on earth started	$9.6 - 9.9 \times 10^9$	$4.2 - 3.9 \times 10^9$ years ago
First single-celled organism emerged	$10.3 \times 10^9$	$3.5 \times 10^9$ years ago
Earliest multi-cellular organisms	$11.7 \times 10^9$	$2.1 \times 10^9$ years ago
Last universal common ancestor (LUCA) of animal & plant kingdoms	$10.3 \times 10^9$	$1.6 \times 10^9$ years ago
Plants (algae) & arthropods	$13.35 \times 10^9$	$450 \times 10^6$ years ago

To put these different stages of development in perspective, I decided to compress the time span from Big Bang up to the present time into just one week. Therefore, a week of  $7 \times 24 \times 60 \times 60$  seconds will represent 13.8 billion years. Thus, one second of a week will represent 22,817 years.

## The Universe in a Week

So now, we will compress the entire life of the universe into just this one week. The theory of creation starts at zero time on day one and proceeds through the days until the present time which will mark the end of the seventh day.

To review the story in a little more detail, the universe started with a Big Bang, as mentioned above, and started the space-time continuum going. Matter and energy were flung out from the tiny singularity and fanned out in all directions. The temperature at this point is estimated to be  $10^{13}$  centigrade. That is ten trillion degrees!

As the universe expanded, it started to cool down. At some point, the inherent Natural Forces split, and the gravity part set in and began pulling in the out-flying matter to draw together to form aggregates. The pull of attraction accelerated as the bodies got closer to each other and stars started taking shape. As the whirling mass of matter increased, the temperature inside the star's body increased. Due to this enormous compression, the process of nuclear fusion started. The stars began to glow and emit light. In other words, the universe became visible. That process took place 500 million years later. That works out to six hours on our week's scale. We can imagine that the universe was created at midnight and daylight came on in the morning at six a.m.

Now, as the stars move out, gravitational attraction between the adjacent bodies gets them closer to each other. Clouds of them form, which as they spiral around, take shape as galaxies. This ended up forming the 100 billion galaxies, each with about 100 billion stars!

The Milky Way cloud started to form about a billion years after creation, i.e. 14.6 hours after time zero in our week's calendar. The present spiral form of the galaxy took shape 3.7 days later, i.e. 4:48 p.m. on the fourth day.

Baby earth started forming in orbit around the sun at approximately 4:00 p.m. on the fifth day. The moon was created when a celestial body crashed against the earth thus chipping away material that eventually coalesced around the earth orbit. That was less than an hour after the earth's formation.

The earth began to settle into form, and in another 200 million years, water was formed. Primitive life started in yet another 200 million years, i.e., 9:00 p.m. on the fifth day. Common ancestors of plants and animals split at 5:00 p.m. on the sixth day. Multi-cellular organisms made it at 9:30 p.m. on this same day.

Life eventually crept out of the waters and moved onto land at 6:30 p.m. on the seventh day. Land was barren all these millions and millions of years until this time. It is mindboggling to imagine there were no land creatures, day in and day out, all these years.

So, what we see around is what developed only on the last quarter of the last day of the week. The dinosaurs that dominated the world some 250 million years ago, and the birds and mammals that followed, were all a recent phenomenon. Primates like the chimpanzee, and our own ancestors, the Australopithecus Afarensis (Lucy) all came on stage in that last span of time.

The chronology of the universe's history compressed into a week appears as follows:

Table 2

<b>First Day</b>	0:00 time	Big Bang
	6:00	Stars shine
	14:36	Milky Way cloud formation
<b>Fourth Day</b>	16:48	Spiral galaxy took shape
<b>Fifth Day</b>	16:00	Proto-Earth formed
	16:48	Moon formed
	20:54	Life created on earth
<b>Sixth Day</b>	5:00	Last universal common ancestor split
	21:36	Multi-cellular organism
<b>Seventh Day</b>	18:30	Land life began

So, all the rest of evolution that created the present species took place only in the last five hours until midnight.

But, as this is too much compressed into these last hours, it is difficult to discern the details and see if they are evenly spaced out. We take the relatively short time of earth's age and spread it out to see the details.

## Chronology of Timeline on Earth (counting back in time)

Table 3

Earth formed	4.6 x10 <sup>9</sup> years ago
Water formed	4.4 x10 <sup>9</sup>
Earliest life in water	4.2 x10 <sup>9</sup>
Universal common ancestor of plants & animals	3.9 x10 <sup>9</sup>
Multi-cellular organisms	0.8 x10 <sup>9</sup>
Fish	440 x10 <sup>6</sup>
Land plants from algae	434 x10 <sup>6</sup>
Dinosaurs	225 x10 <sup>6</sup>
Mammals	161 x10 <sup>6</sup>
Birds	155 x10 <sup>6</sup>
Homo Sapiens in Africa	250 x10 <sup>3</sup>
Replaced Neanderthals	50 x10 <sup>3</sup>
Neanderthal goes extinct	30 x10 <sup>3</sup>
Hunter-gatherer homo erectus	1.8 x10 <sup>6</sup>
Homo habilis used stone tools	2.5x10 <sup>6</sup>
Fire controlled	1.6 x10 <sup>6</sup>
Spear used	0.4 x10 <sup>6</sup>
Adam and Eve came on stage	0.17 x10 <sup>6</sup>

If we compress this time span into a week calendar, the following is how it appears:

Table 4

<b>Time Zero</b>	0:00	Earth Formed
<b>First Day</b>	2 p.m.	water formed
<b>Second Day</b>	16:00	single cells
<b>Fourth Day</b>	23:00	complex cells
<b>Sixth Day</b>	10 a.m.	multi-cellular organisms
<b>Seventh Day</b>	7 a.m.	insects
	2 p.m.	reptiles
	4 p.m.	mammals
	6 p.m.	birds
	6 p.m.	homo sapiens
	11:33 p.m.	Adam & Eve appeared

Eve's family life was less than half-an-hour on this week's calendar.

It has always amazed me how change accelerates towards the end. It looks like a marathon race where they sprint to the finish line. We see that the whole history of mankind is what took place in less than half-an-hour of the entire week's calendar of earth's existence.

I am wondering if this sprint phenomenon (dashing forward) also applies to cultural development of mankind. Progress in civilization is one aspect. Population growth (unrestricted) will be another. There are other facets of culture that can also be considered. I will take religion as one of the manifestations and see how it progressed.

It appears difficult to pin down when and where religion started. It is true that mankind ever since he was conscious of himself felt that there should be a super power who got things going around here-- a power who controls these humanly uncontrollable happenings like weather, disease, rain, harvest, love, death, war, fertility, etc.

The Greek gods and goddesses are a prime example of ancient practices in religion. These gods had characteristics that were like humans. For example, they needed to be

appeased when angry. One also had to solicit their favor by offering sacrifices: slaying sheep, cattle or even humans. Abraham's offer of his son, Isaac, comes to mind in this case. But, of course, religion didn't start at that. It was there long before.

## Chronology of Religion

If we give religion a broad definition, burial ceremony (where objects like cloth, beads, food, etc. were buried as travel packages intended to be used in the afterlife) was started in 25,000 BC. The concept of life-after-death or the belief in the supernatural and hence the starting point of religion is taken to be that long ago.

Sites of worship have been found by archaeological digs dating back to 9000 BC. Sacrifices to deity have gone on since at least 4500 BC. Stonehenge in England is still standing. It was built around 3100 BC as a cemetery and altar.

The pyramids were built around 2600 BC.

The famous Giza pyramid was completed in 2560 BC.

Goddesses were worshiped on the island of Crete in 2200 BC.

Hinduism, the oldest but still practiced religion was started in 1700 to 1100 BC. Some mark it at 2500 BC.

Abraham, the patriarch of both Christian and Muslim religions, lived about 2000 BC. Moses handed down the 10 Commandments around 1450 to 1250 BC.

Lord Krishna was honored around 800 to 600 BC.

Confucius was born in 551 BC and wrote about harmony of life around 500 BC.

Buddha was born 563 BC.

Jesus lived 4 BC to 30 AD and birthed Christianity. Orthodox church established around 33 AD. Mohammed ibn Abdullah (The prophet) was born 570 AD. Islam was established.

Islam split into Sunni and Shite in 680 AD.



Other religions formed	Year Founded	Founder
Roman Catholic	1054	Pope Leo III
Lutheran Church	1517	Martin Luther
Anglican (Church of England)	1534	Henry VIII
Calvinist	1555	John Calvin
Presbyterian	1560	John Knox
Congregationalist	1582	Robert Brown
Baptist	1609	John Smyth
Methodist	1739	John Wesley
Episcopalian (USA)	1789	
Disciples of Christ	1827	
Mormonism (The church of J.C. of latter-Day Saints)	1830	Joseph Smith
7 <sup>th</sup> Day Adventist	1863	
Jehovah's Witnesses	1874	Charles Russel
Christian Science	1879	
Scientology	1952	

Now to get perspective of the rate of founding religions, let us compress the whole span of time into a week.

1 <sup>st</sup> day	0:00 time	Burial ceremony (food enclosed for afterlife usage)
5 <sup>th</sup> day	3:30 a.m.	Site of worship uncovered
6 <sup>th</sup> day	7:29 a.m.	Sacrifice to deity practiced
6 <sup>th</sup> day	4:11 p.m.	Stonehenge built (cemetery & altar)
6 <sup>th</sup> day	7:00 p.m.	Pyramid built

6 <sup>th</sup> day	7:55 p.m.	Hinduism started
6 <sup>th</sup> day	9:47 p.m.	Goddess worship practiced
6 <sup>th</sup> day	11:00 p.m.	Abraham lived
7 <sup>th</sup> day	2:58 a.m.	Moses
7 <sup>th</sup> day	7:00 a.m.	Krishna
7 <sup>th</sup> day	7:58 a.m.	Buddha
7 <sup>th</sup> day	8:22 a.m.	Confucius
7 <sup>th</sup> day	11:35 a.m.	Christianity started
7 <sup>th</sup> day	3:10 p.m.	Islam started
7 <sup>th</sup> day	3:36 p.m.	Shite split from Sunni
7 <sup>th</sup> day	5:55 p.m.	Catholics split from Orthodox
7 <sup>th</sup> day	8:48 p.m.	Lutherans (Protestantism) started

Then Anglican, Presbyterian, Baptist, Methodist, Episcopalian, Mormonism, Jehovah's Witnesses, Adventist and others all followed in rapid succession.

One is tempted to pose the following question: "If mankind lived without the current religions for Millenia, how is it so suddenly indispensable for us now to have it?" Man lived all week from Monday to Saturday without these major religions, and when they arrived Sunday afternoon, we find mankind is doomed without having them? How come? Are they going to be applied retroactively to the Millenia of generations past? Or is it only for those of us who happened to come to life in the waning hours of the last day of the week? Why just us?

Again, which one of those hundreds of denominations of religions is the right one? Logically, not more than one of them can be just right. But, if all are deemed acceptable, then not having one should as well be acceptable. Perhaps even preferable! Since many of these religions are, as we know, incompatible with one another. Consider some major religions: The Hebrew religion believes in just one god. The Christian religion goes with the Trinity.

Islam proclaims Allah and his prophet, Mohammad.

Hinduism has many gods, Brahma, Shiva, Vishnu (and their wives) etc.

Buddhism has no almighty deity but instead believes in daily purification to join Nirvana.

How then, one wonders, can these dogmas and creeds be reconciled into one that is acceptable to all humanity? Today, each religion has its own devout followers, deeply set in their conviction of its own truth.

Consider the crowds that show up at their respective religious holidays.

The Roman Catholics seeking the blessing of the Pope at the Vatican's Mass celebration.





The Orthodox Christians coming together in Jerusalem to worship at Easter.



The Muslims celebrating Eid al-Fitr in Mecca.





The Hindus, in their tens of thousands, plunging into Ganges River to cleanse their sins.



Further, there are several million people around the world backing each one of these religions. There are also other denominations spinning out of these beliefs. By far the highest number of denominations springs from the Christian religion.

Nowadays, one finds forty or more so-called major classifications in Christianity alone. Going down to detailed sub-divisions, there are reported to be 30,000 or more classifications. One would have to be supremely self-confident (or vain?) to think his/her sect is just the right belief and all the rest of the world have gone astray and are condemned in their millions.

This begs the question: How does one believe all those ascetics and mystics who claim that God told them to write what they wrote?

We contemplate-- in a righteous self-preservation-- about the purpose for our existence. How about the existence of all the rest of the millions of species dead or alive? Are they all for nothing because they don't have souls? I am not sure. I think it is time to sober up, stop being brainwashed, remove the veil of ignorance and observe the surrounding reality.

See how awesome and inspiring it is to look up to the dark clear sky above and contemplate nature's staggering billions and billions of stars, each a million or more times bigger than our earth! Consider that most have their own planets and very likely their own world of living creatures too!

In conclusion, one thing is obvious: The number of religions and their denominations has skyrocketed in these last few hours of the weekly calendar of creation.

Homo sapiens have a long history of existence; but regardless, we now feel it is inconceivable to live without these religions just revealed a few hours ago in the weekly calendar.

## The Story of Extinction of species (and the purpose of creation)

The question as to why we're here does not get a uniform answer from philosophical, religious and scientific quarters. Life is important and is highly esteemed among all societies. Even animals are known to grieve when their colleagues die. The extinction of a species is even more grave. It cannot be replaced. If a person dies, someone else will show up to fill his shoes. But if all mankind died, there is no replacement. That is a species lost forever.

It takes millions of years in combination of mutations and chances and survival struggles to come up with a species of creatures. So when one gets lost after all these episodes, it is sad. Unfortunately, extinction of creatures is not uncommon in nature.

We know that 445 million years ago, more than half (60%) of all life on earth was wiped out. How many thousands of species those were, I don't exactly know.

Three hundred and seventy million years ago (Devonian Epoch) seventy percent died off. Even worse, 251 million years ago 90-96% of all life was extinguished. That was the Permian Epoch.

Again, 201 million years ago (Triassic Period) seventy-five percent disappeared including the familiar Woolly Mammoth, the Dodo (pigeon-like), and Tasmanian Tiger. Recently, i.e.  $66 \times 10^6$  years ago, seventy-five percent died off (cretaceous extinction that included the famous

dinosaurs. It was only after then that primates came into their own. That may have helped our species to develop but Nature appears merciless in treating its creatures anyway.

Now take our own close ancestors. There were many species of humans that inhabited the earth at various times. There was the homo erectus (upright walker) that lived in Africa, Euro- Asia, China, Indonesia, etc. It reigned between 1.8 million years ago (and 143,000 years ago) but died out nevertheless. Homo ergaster got to the level of using advanced stone tools. But they died out too. Java man, who lived in Indonesia & neighborhood, is gone as well. The Peking man whose fossils were found in China is no more. Homo Rudolfensis (fossil found in Kenya), Homo Naledi (from S. Africa), The Boskop man (who possessed an even bigger brain size than our own) all perished. The Penghu man, The Denisovans (Tibet), the Domenisi, the Penghu (Taiwan & surroundings), and many others, all died out.

Recently there was the Neanderthalensis which our own race came across when migrating to Europe and Asia. We lived side by side for a long time and even our DNA composition was 99.85% the same. Our difference was only 0.15 percent! But they died out.

For now, only the Homo Sapiens species (human being) is left standing on its feet. This is a lot of destruction. If this last one standing went the way of the others, nature does not seem to care. Scientists reckon that 150 to 200 species of plants, insects, birds and mammals become extinct every single day. Some are caused by humans, but others just lose the fight in the struggle for survival. The game is "survival of the fittest."

There is no moral consideration in the jungle. The end result is that 98 to 99 percent of all species ever created have gone extinct. The current estimate for the number of species on earth is one trillion or less. By that reckoning, it is about one percent of all created on earth that we now find. Ninety-nine percent have been lost. What a devastation of species! But, as we said, Nature is relentless. If a species cannot succeed, it is eliminated. This is Natural Selection in action. The unselected are shown the exit door.

Here, one may ask: What then is the purpose for the creation in the first place?

## Aliens (UFOs) and Us

The picture of aliens (extraterrestrial creatures) is a familiar one to us. Aliens have big slanting eyes, small mouths, and very large foreheads resting on a tiny-frame body. The image is popularized by science fiction films mostly coming out of Hollywood; but many people take it seriously. Scientists don't dispute that there can be life in other parts of the universe. All stellar bodies are, as far as we know, fundamentally similar in consisting of hydrogen, helium, and a splatter of the heavy elements listed in periodic tables. If life could evolve on planet earth, and there are billions or trillions of similar planets in the universe, then there is likely to be millions of planets harboring life.

But how likely is it that we can be visited by any one of them? I think the chance is near zero! The reason is the distance between the stars. It forbids physical space travel. To illustrate: The moon is 250,000 miles away, yet it took three days of travel for American astronauts to reach it. Mars is fifty million miles away. The famous satellite called Mars Pathfinder took 212 days to reach Mars in 1996.

The nearest star to earth (Alpha Centauri) is twenty-five trillion miles away. Let's ask ourselves how long it would take to travel there. 'New Horizon' is the fastest satellite (at 58,000 km/hr.) traveling in that direction. It will need 79,000 years to get there! Let's pause for a while to consider that more closely. Suppose we send a crew of astronauts there. How many generations of this crew will it take to get there? One generation is taken to be thirty years. Because a baby born this year will begat a child of its own in another thirty years. That starts another generation. By that reckoning, 79,000 years divided by 30 = 2,633 generations will pass before one ever gets there! Even if we are generous to take fifty years for a generation that still takes 1,580 generations. All these generations living in the space ship will die one generation after another on the way to that star. How will the physical and educational state of the arrivals prepare or equip them to cope with this unknown terrestrial environment?

We are talking of a distance of 4.2 light years to Alpha Centauri. The other stars are hundreds of times farther. The Milky Way galaxy is itself one-hundred light years in length. If there is life on a planet halfway on this route that is fifty light years away. If it took us 1,580



generations to reach Alpha Centauri at 4.2 light years away, how many generations does it take us to travel fifty light years? Other galaxies are tens of millions light years away. How do we cover this distance?

That is why space travel is forbidding. So, for aliens to travel here from another star system and return home stealthily is incomprehensible. It only takes a high school astronomy class to impress the reality on people. As for the theory of using worm holes (tunnel) to bore through time- space fabric, that hasn't gone anywhere even theatrically.

That was why I was caught by surprise when I read an article in the *Las Vegas Review Journal* (December 21, 2017) quoted from *New York Times* magazine that a high-ranking US senator helped dole out twenty-two million dollars of federal money to his friend to pin down these elusive extraterrestrial visitors hovering around here.

When asked why he did this, the senator was unblinking, "I am not embarrassed or ashamed or sorry I got this thing going. I think it is one of the good things I did in my congressional service. I have done something that no one has done before" he bragged. The money allocated was handed to an aeronautical research company wholly owned by his close friend who also took a firm stand and said that he was, "Absolutely convinced that aliens exist". Fair enough so far, but he continued, "and the UFOs have visited the earth!" That is that.

But to explain this phenomenon, I will borrow the words of Dennis Overbye, a *New York Times* commentator and say, "Most UFO sightings turn out to be swamp gas and other atmospheric anomalies, Venus, weird reflections or just plain hoaxes." [*Las Vegas Sun, January 3, 2018*]

There is another scenario to consider: One should note that the United States Air Force keeps a secretive area (national security site) popularly known as "Area 51" in the state of Nevada. At Area 51 they research, develop and test military weapons. For example, from 1950 to 1960, they conducted approximately 1,000 underground nuclear bomb detonations there. Now flying machines, among others, are being researched. Saucer-shaped planes are deemed "planes of the future" as they are aerodynamically suited to glide through air, offering the least resistance to friction. These prototypes under test are spotted occasionally by the public.

In other venues, the Defense Department keeps track of all unidentified flying or swimming objects (including meteors) with the help of surveillance tools like spy planes, ground-based radars, submarines, and more importantly, satellites. There are also government agencies like defense contractors such as Lockheed Martin, who research super-fast aircrafts, spy planes and 'invisible' surveillance machines.

This is all classified information not available to the public. Most of the sightings sensationally reported by pilots and stargazers are accounted for.

So this search for organic intelligent beings that take millions of years to travel here to earth in their confined spaceships (big or small) stay unnoticed by any of our numerous tracking instruments, and head back on a return million-year journey is beyond comprehension.

## School Curriculum Lacking

This got me thinking about the possible corrections we could make to our school curriculums. If people in high leading positions are so uninformed about the sciences (and there could be some who still believe that the earth is flat and that it is only 8,000 years old), how can we trust them to make sound decisions on concerns like global warming, health matters, and other scientific issues. I remember a case when a school board forbade the teaching of evolution in their schools. Ignorance is not uncommon in high circles! The curriculum should be structured to orient everyone about our place and significance vis-à-vis the observable sky.

Geography is taught (not sufficiently in many countries) so citizens know their location in the world. Extend that lesson to teach everybody where we are in the solar system, in the galaxy, in the cluster, and in the known universe.

Man's natural curiosity has, since Millenia, been answered by ascetics or mystics. Some claim that they were talked to by God and others by angels. There is no independent way of proving that. Many have claimed to be prophets but have been shown to be fake. It is these that built our faith system. This has served humanity a great deal. It mostly teaches good morals and healthy social codes. It helped to promote love, friendship and peaceful

coexistence. That is how the weak and the strong managed to live side by side. It is moral justice that ruled society before the police force arrived.

Perhaps modern science education may run the risk of discrediting and dispelling these beliefs. True, there are beliefs that promote killing of what they call “unbelievers” as though God is powerless to kill them Himself but instead delegates the task to people and then goes to reward them for the help. How long can we hide behind ignorance? Let us teach reality as we see it and find remedy for the short-falls. We know how much suffering was inflicted on people during the ‘Inquisition’ period of the 12<sup>th</sup> to 19<sup>th</sup> centuries. Today, in poor countries there still are ‘evil eyes,’ witches, wizards, and ghosts causing suffering to people.

True, there are millions of people who stand to benefit from the positive aspect of faith. One only needs to visit churches, mosques and other sanctuaries to witness congregations of people praying, chanting and worshipping. These all bestow peace, tranquility and friendship among the faithful and even extends to the community at large.

One only hopes that this state of affairs will smoothly transition to a state of rational beliefs based on scientifically demonstrable facts. That should be the task of schools and colleges.

But I would even dare to suggest that this isn’t enough. The coming generation should be pushed or thrust forward more forcefully to catch up with the mass of scientific knowledge that is exploding in leaps and bounds. Let me take one case in astronomy that I witnessed mushrooming in my own lifetime. When I was starting school, I knew the earth to be flat. The sun traveled west across the sky and it repeated the course every day. The stars which came up only at night were fixed in the firmament above and twinkled down benevolently on us. It is written that at ‘end of times’ the stars of the sky fell to the earth as the fig tree sheds its winter fruit when shaken by a gale. That big or small was how I came to imagine the stars.

Now my first shock came when I was taught the earth is round. I didn’t dare to tell such ‘heresy’ to my parents. I kept it to myself so I could regurgitate it in the exams to get the marks good enough to keep out of trouble. Then, when the teacher taught that the earth (and eight other planets) revolved around the sun, that was the end of knowledge at the time. That the sun was stationary like the stars was not in question even to the teacher.

It was a long while later that I was taught that the sun is just one of the millions of stars in the sky that together comprised the Milky Way galaxy. The Milky Way, as a whole, moved somewhere!

It was only comparatively recently that I learned that the Milky Way is just one galaxy among others that included Andromeda galaxy and the Magellan clouds that formed a cluster around the center of which they all revolved.

Then followed the revelation that this cluster of galaxies itself (now termed 'local cluster') was only one of many other such clusters that together formed a big cluster around the center of which they all revolved! We now learn that center of the big cluster is also in motion in yet some other direction carrying with it all these members.

The motions outlined here can be tabulated as follows:

- a) The earth rotates around its axis;
- b) At the same time, it revolves around the sun, as all planets do;
- c) The sun is not stationary. It revolves around the center of the Milky Way galaxy;
- d) The center of the galaxy isn't stationary either. It revolves, taking with it all the 100-400 million stars around a local cluster of galaxies that consists of Andromeda, the Magellan clouds, etc.;
- e) The center of the local cluster of galaxies isn't stationary either, it moves around the center of a major cluster that comprises other similar clusters;
- f) Again, that center of the major cluster is also moving in some direction.

For those readers interested in the speeds involved in these motions, here are the figures:

Earth's rotation	1,666 kph about its axis (at the equator)
Earth's revolution	107,000 kph around the sun
Sun revolving in Milky Way	675,000 kph (250 million years to complete the round)
Milky Way revolves around local cluster	600 km/s
The cluster moves	300 km/s
Our total speed in the universe adds up to	$4.4 \times 10^6$ kph through space!!

Thus, we are hurtling in space at the fantastic speed of 4.4 million kph. Isn't that amazing, humbling and condescending? This is how the boundary of knowledge expanded dynamically in my own lifetime. Thanks to the perseverance of our astronomers who built and launched satellites like the Hubble telescope and International Space Station (ISS), so we could peer deep into space and make observations to learn about our environment.

Similar advances have been achieved in the fields of evolution, genomics, computers, mathematics, and other branches of science that our students have to catch up with at the rudimentary entry level. That endows them a broader outlook, critical thinking and deep understanding so they become well-rounded citizens. I had time to grow in step of the discoveries, but they don't. They have a catch-up to do.

## Epilogue

As I proceeded to present this write-up, some thoughts kept coming to my mind in relation to the topics under consideration, but I couldn't digress from the narrative to cover them. Now that I have presented my intent as originally envisioned, I can go back and visit those moments that struck me at the various times of writing.

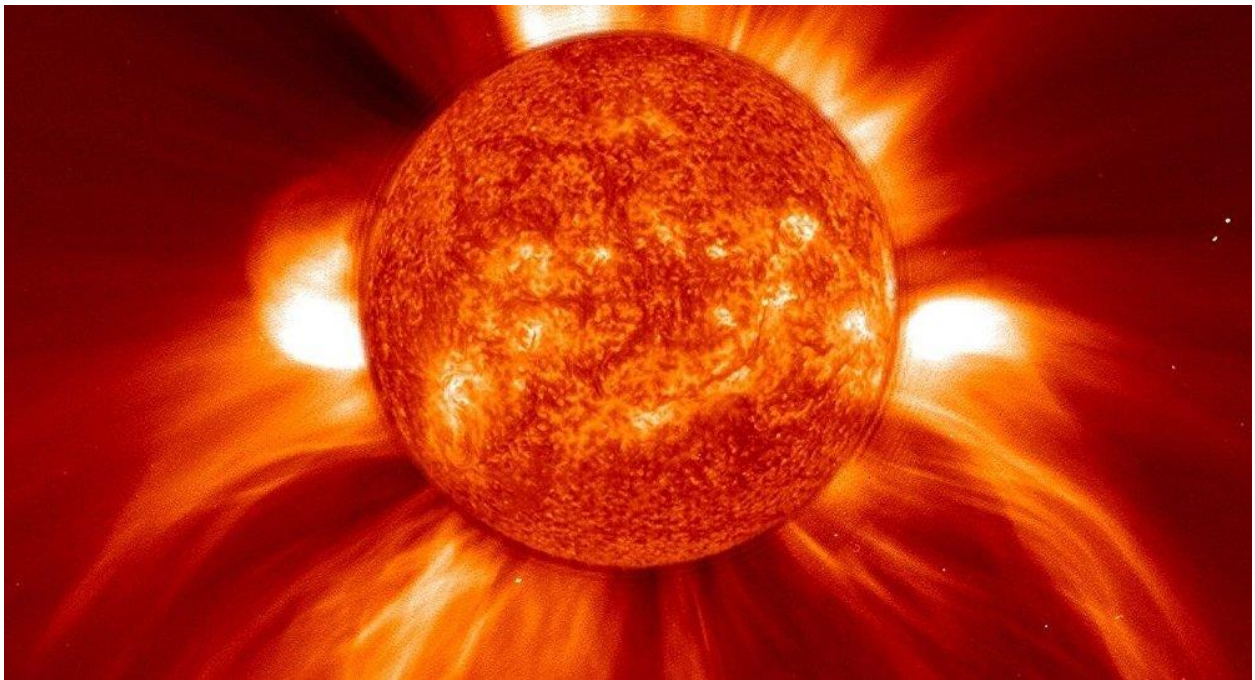
When dealing with the planets, galaxies, and clusters some pictures lurked in the back of my mind.

The moon was smooth, round (moon-faced as they say of some people), pacifying to the extent of inviting romanticism among lovers, but when astronauts arrived there they found themselves walking in dust. The celestial body was just dust and stone. Shocking! Note the foot prints left behind by the astronauts.



Human footprints left on the moon's dusty surface.

The sun also appeared calm and benevolent in shining to us, like we were its main concern and its charge. Later, I learned it was itself a 'house on fire' and that sourced the light and warmth we received. The tumult is so severe that flares erupt like volcanos every now and then.



Solar Flares



The Milky Way galaxy containing anywhere up to 400 billion stars looked like a glowing lamp from a far distance. Our poor sun is just one of the specks of light in the outlying fringes.

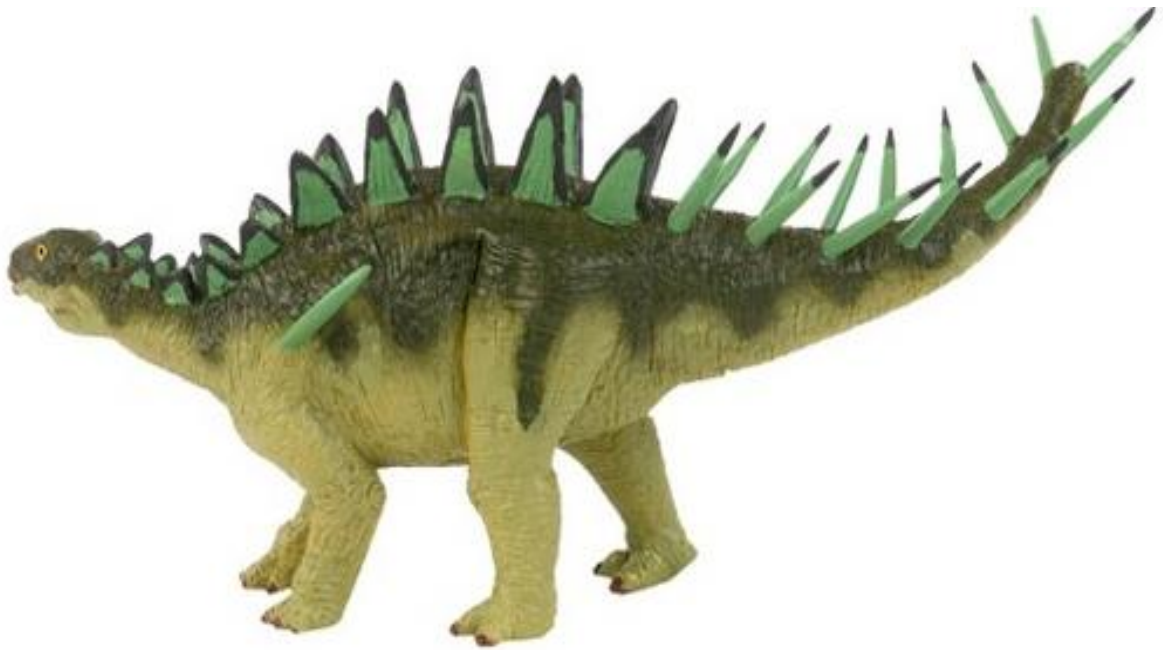


Milky Way

The following picture is that of the Earth and its moon taken by an American satellite from a remote distance.



Imagine then how insignificant we look from a distance. Among the billions of stars each millions of times larger than our planet, we are just a drop in the ocean. When dealing with extinction of animals, the following pictures remind us of lost species.







When it comes to extinct homo species, the Smithsonian Museum depicts some of them as follows:











When covering religion, a whole train of thoughts passed through my mind: - The Inquisition period whereby people were accused of being witches, wizards, evil-eyes, devil incarnates, etc., and were burned at stakes; the days when Galileo was imprisoned and scientist Bruno was burnt alive all due to their claims that the earth is round and it revolved around the sun. It was a doctrine contrary to the established religion of the time.

Now that science has vindicated their claims is really no comfort for the lost lives. History has on record many more cruelties and tortures inflicted upon followers of other religions; but nothing compares to what we witnessed as punishment meted out to so-called 'unbelievers' in recent history.

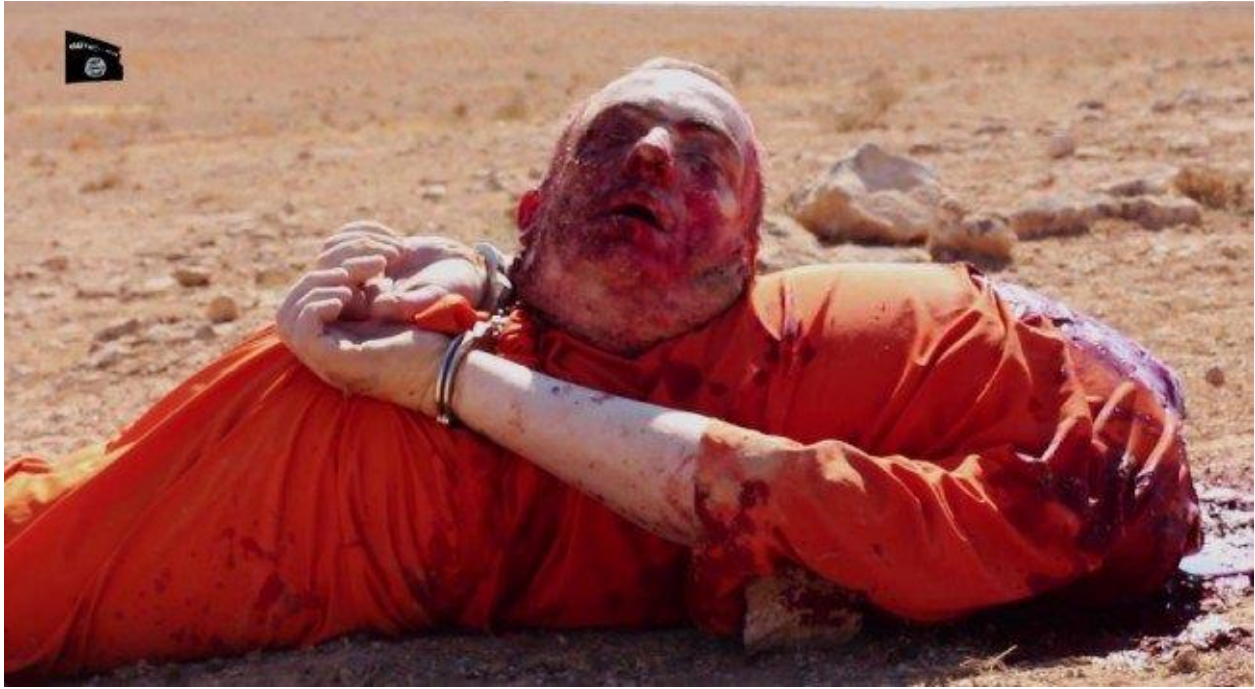
It was a group of twenty-eight Ethiopian Orthodox Christian migrants intercepted by an affiliate of ISIS (Islamic State of Iraq and Syria) on their way to Europe through Libya. It was April 2015. Sixteen of them were shot straight through the head. What was most horrific, in my eyes, is what befell the other twelve migrants. With their hands tied behind them, they were paraded and forced to kneel. They were then prostrated on the ground and beheaded! The severed head was then placed on the back of the decapitated body as the blood gushed out of the neck.

It was a similar fate meted out to twenty-one Egyptian Coptic Christians prior to this.





The severed head was then placed in the same manner as shown for another victim – a British citizen named Alan Henning – who was decapitated in October 2014.



The Ethiopian migrants were labeled “followers of the cross from enemy Ethiopian church.”

The message issued to the world at large, on the occasion of this persecution, was unambiguous: “We swear to Allah, you will not have safety even in your dreams until you embrace Islam.”

That message is for two billion Christians, one billion Hindus, a multitude of Chinese and millions more of people of other faiths.

Now, how did we get to this stage of intolerance of each other’s religions?

We should get the sciences to come in and shine light on darkness and endow us with knowledge. Reality does trounce illusion.

So then, how do we go about preparing the next generation for this challenge?

And how should the school curriculum be devised?