



Highly Commended

Science Writing

Year 3-4

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Mysteries of the Universe.

"Remember to look up at the stars and not down at your feet. Try to make sense of what you see and wonder about what makes the universe exist. Be Curious." Stephen Hawking.

Introduction :

Everything in the universe is a part of something bigger. Our Earth is a part of the Solar System. The Solar System is a small part of the Milky Way galaxy which is a tiny part of the entire universe. Gravity is a force that holds billions of stars, planets, galaxies, dust and even gas together. Gravity gives galaxies their special shapes. In fact, many newly discovered mysteries point out that the size of the universe may be infinite! What are these mysteries that make the universe so beautiful, strange and fascinating?

In this essay, I have shared five most mysterious secrets of our universe.

1. How did it all begin? With the big bang!

So many scientific theories and mythological stories have tried to explain the mysterious

Origins of the universe. But the most widely accepted is the 'Big Bang' theory proposed by Georges Lemaitre in 1927. He stated that the universe began from one very small, super charged particle and expanded infinitely!

EVOLUTION OF THE UNIVERSE

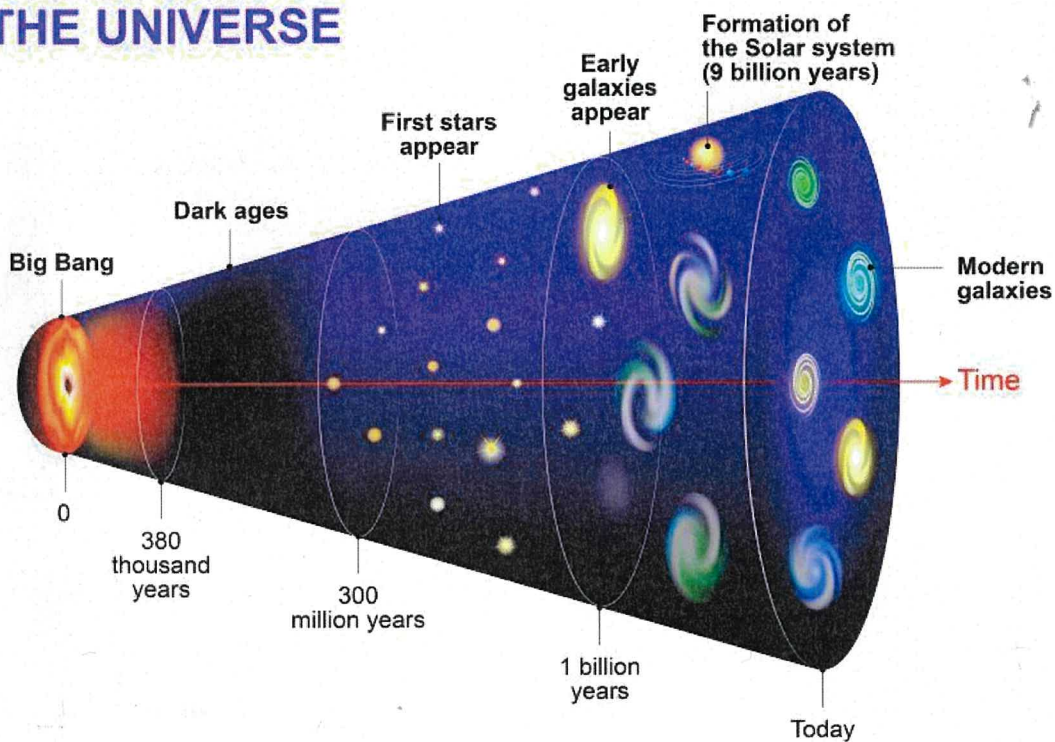


Image 1: Courtesy: Shutterstock.com

About 13.7 billion years ago, this tiny, super charged particle exploded violently with a bang. From this explosion came matter, energy, space and time. This explosion created a lot of radiation and energy, both of which transformed into nuclear, electromagnetic and gravitational

forces. This led to formation of protons, neutrons and electrons. After this, the first two elements, Helium and Hydrogen were formed.

Stars, galaxies, asteroids, comets and planets were forming, regrouping, clashing and many were also dying.

An astronomer, Edwin Hubble noticed that the galaxies were moving away from each other.

This means that if things were moving apart, once upon a time there were closer to each other, so close that they all started at a single point.

2. Black holes:

A black hole is an area of immense gravity that nothing can escape from it — not even light. That is why it is invisible.

A black hole is created when a star runs out of its fuel and collapses into itself as a tiny point. The entire mass of the star is trapped in that point so it has enormous gravity! Circular area around the point is called an event horizon. When an object comes closer to the event horizon, it gets stretched out like a spaghetti through the center of the black hole. This is called 'Spaghettification'!

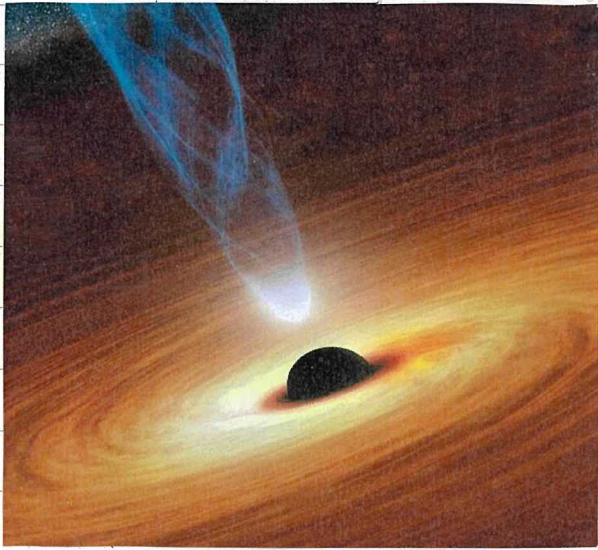
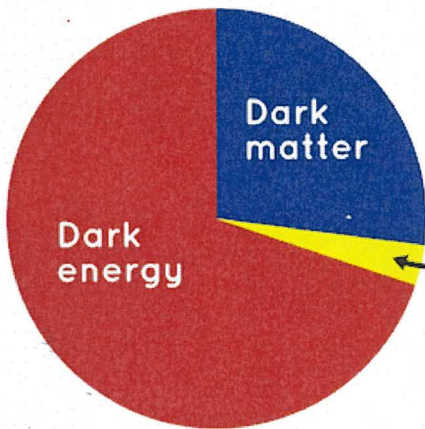


Image 2: courtesy: NASA
Artist's impression of 'spaghettification'

3. Dark energy and Dark matter:



The matter we understand. All the planets, comets, stars, galaxies, black holes, and more.

Image 3: courtesy: NASA

Galaxies, Stars, planets, asteroids and black holes inhabit the universe. Scientists have proved that the universe is expanding. There is an unknown energy that is making

the universe expand. All we know is, there is a lot of it. It makes up 68%, about two-thirds of the universe. Scientists call it 'Dark energy'.

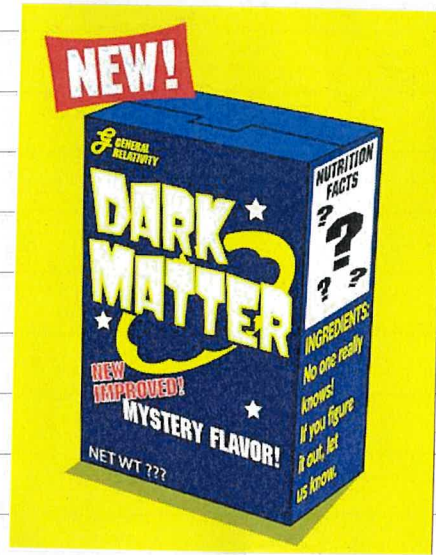
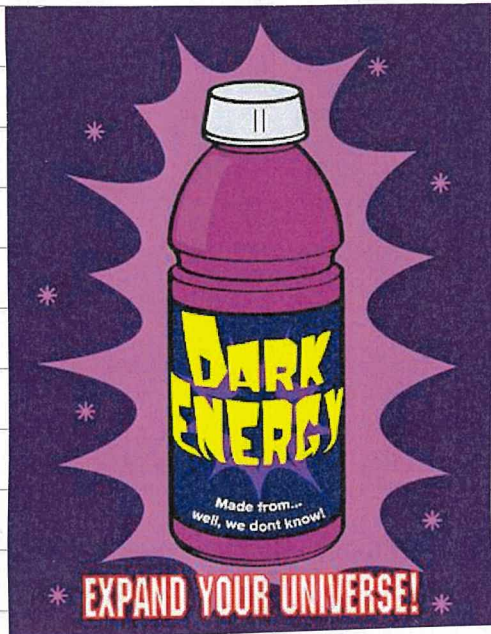


Image 4 ; courtesy : NASA space place

There is also a larger force than gravity that holds up the universe. This force is unknown, unseen and does not interact with any type of light or waves. It is not a black hole. It is called 'Dark matter' and 27%, nearly one-quarter of the universe is made of it. Together 'Dark energy' and 'Dark matter' make up 95% of the universe, leaving only 5% to all matter and energy we know and understand.

4: Exoplanets :

Planets that orbit stars other than the sun are called 'Exoplanets'. Astronomers and scientists are interested in exoplanets that are at a special distance from their stars. This special distance is called 'habitable zone' where life may be possible.

In 2009, NASA launched a spacecraft called Kepler. So far, Kepler has discovered thousands of exoplanets.

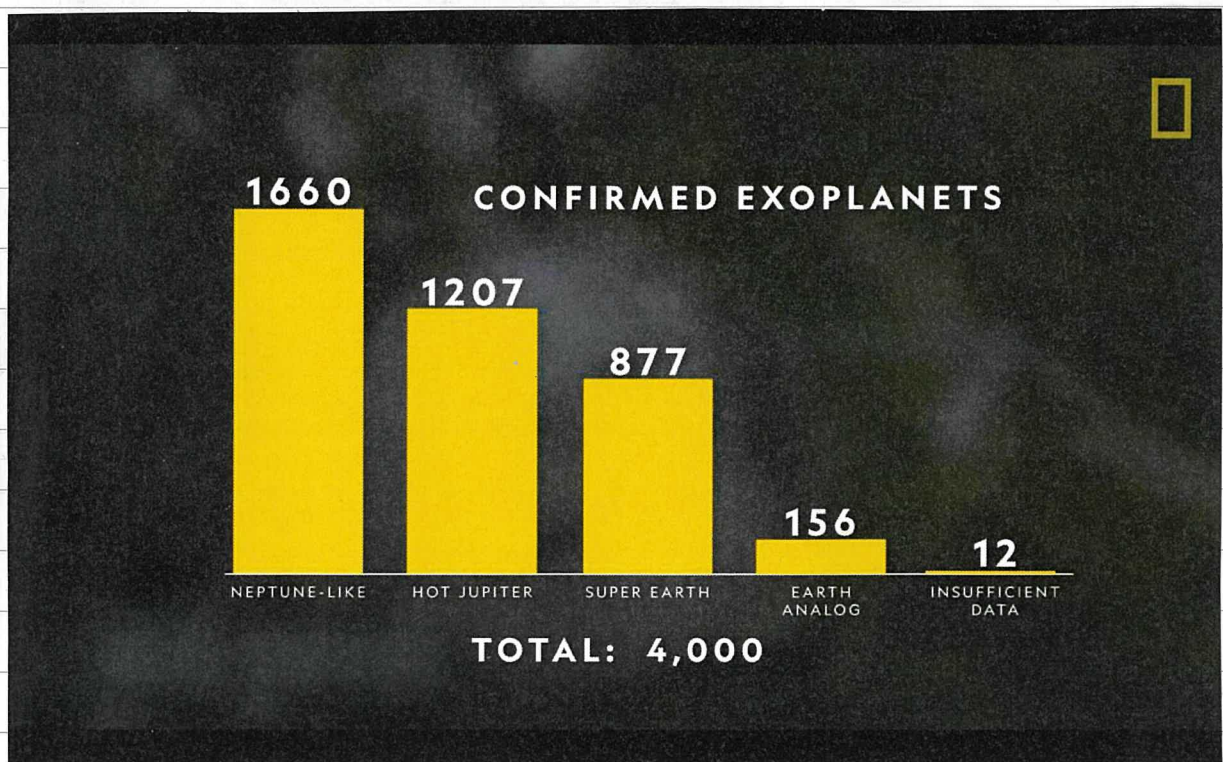


Image 5: courtesy: National Geographic . Com

There are two main methods of finding an exoplanets :

1. Transit method.

2. Radial velocity method.

In 2017, the largest batch of earth-size habitable zone planets were found orbiting the star, TRAPPIST-1.

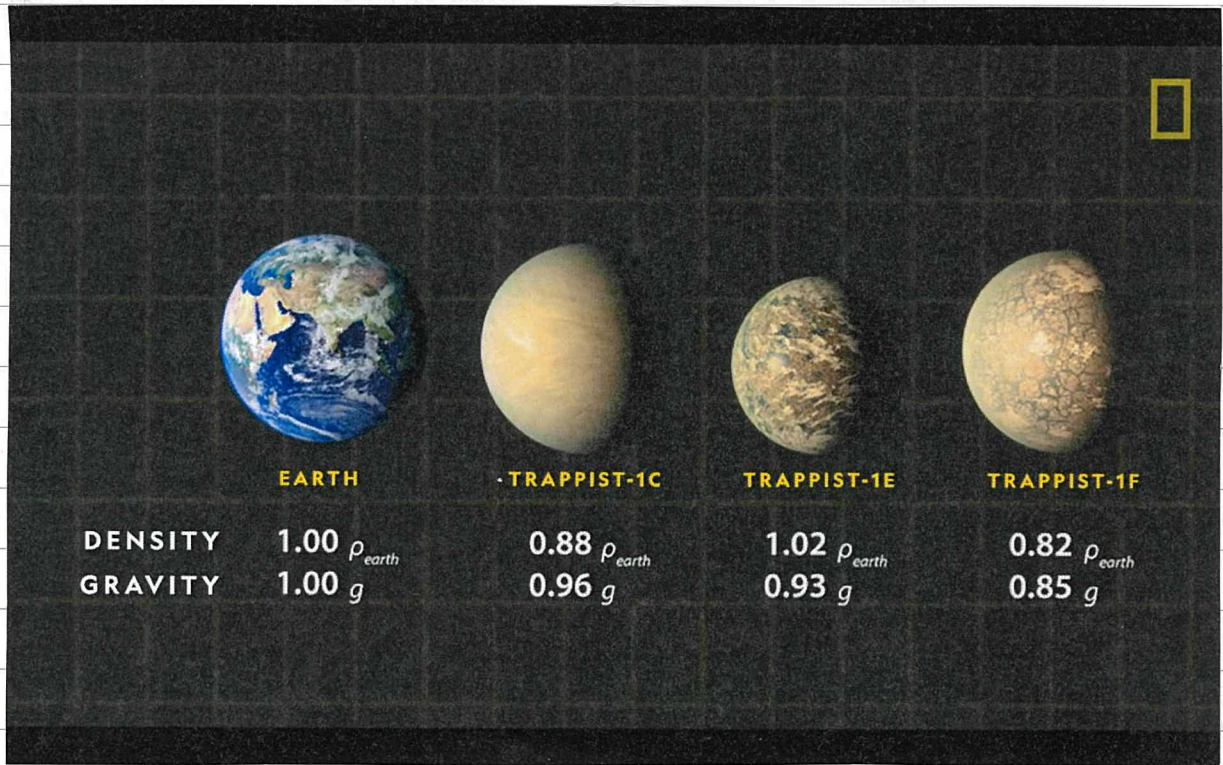


Image 6: TRAPPIST 1 Exoplanets courtesy: Natgeo.com

5. IS time travel real?

A second for someone on earth is different to someone travelling in space. Einstein's theory of relativity is the basis for time travel. His theory says that time and space are linked together. He also said that in the universe nothing can travel faster than the speed of light. Although, we can't use time machine to travel into the past or future, the math of time does affect how we observe time travel.

Every time we look at the night sky through a telescope we see the star light from the past. As the objects in space are far away from the earth, we use light-years to measure the distance. A light year is a distance the light travels in one earth year. 1 light year = 9 trillion Km.

In conclusion, mysteries of the universe are captivating. Many scientists have dedicated their lives to uncovering these mysteries. New technologies continue providing clues to solving these mysteries. But will we ever know all the secrets of the universe?

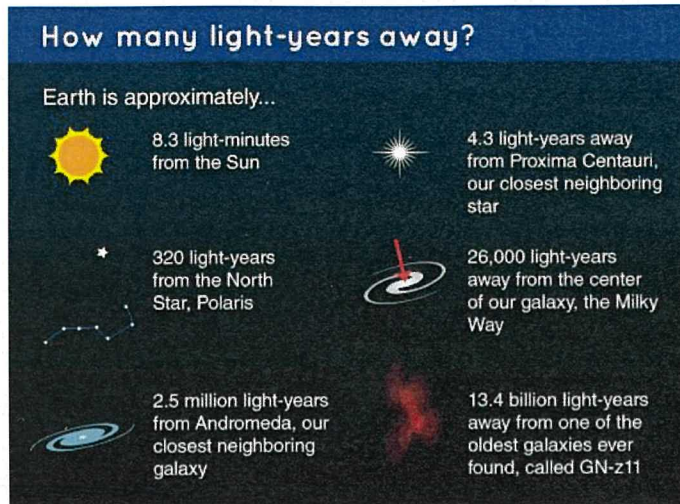


Image 7. Courtesy NASA space place

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8. Who was Albert Einstein?

Word count: 866