



Prize Winner

Science Writing Year 9-10

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Year 10 Science Performance Standard for Assessment

Year 10 Science- Science Writing Task: *Mysteries of the Universe-William Clifton*

First Nations Australians' knowledge of celestial bodies and explanations of the origin of the universe:

The Big Bang theory is a scientific theory that describes the origin and evolution of the universe. The universe began as an extremely hot and dense point that had infinite density and temperature, approximately 13.8 billion years ago. At that point in time all matter, energy, space, and time was compacted together into a single point. Suddenly it exploded causing it to spread extremely quickly and become what we know as space. As time went on (multiple billions of years) atoms formed and eventually massive gas clouds which in turn transformed into the milky way and our solar system. Proceed a couple of million years and we have made it to the present day and our current understanding of the universe.

The Dreaming is the Aboriginal stories of the creation of the universe and how we as human beings came to exist. There are a lot of different versions of the stories, as there are many clans of Aboriginal people. The Dreaming is also called Jukuurpa. Jukuurpa has been said to have no foreseeable end, as evolution is never ending, just like how space is infinitely expanding. It is said that the "Ancestors"/ Mythical beings, or totem animals are the ones who created our earth, laws, and social order for those many tribes. Furthermore, it is said that the spirits are still alive today, in the forms of animals. (Britannica, The Dreaming, 2023)

The Big Bang Theory and the Dreaming are connected in some ways, with their key events explaining the origin and evolution of the universe sharing some similarities and differences.

The origin of the universe is explained in differing ways.

The Big Bang theory explains the origin of the whole universe as all energy and mass being compressed into a singularity. It was confined to one infinite point of denseness and heat which eventually exploded. This sent all the energy and mass out into the endless void that is space, over many billions of years this energy and mass, formed our solar system and Earth.

In comparison, the Jukuurpa (Dreaming) states that in the beginning, when there were no people, trees, no plants or whatever on the land. "Guthi-guthi", the spirit of an ancestral being lived up in the sky. It came down and created the land for our ancestors. After it had set the borders and the sacred sites for all of the Aboriginal clans, the birthing places of all the dreamtime stories.

"Guthi-Guthi" then looked out over the bare land. There was no water in sight, there was nothing growing. So "Guthi-guthi" knew that the water serpent, Weowie was trapped in a mountain (Mount Minara). So "Guthi-guthi" called out to him, but because Weowie was trapped right in the middle of the mountain, he couldn't hear him. "Guthi-guthi" went back up into the sky and he called out once more, but once again Weowie didn't respond. So "Guthi-guthi"

came down with a roar like thunder and banged on the mountain and the mountain split open. Weowie the water serpent came out. Where the water serpent travelled, he made waterholes and streams and depressions in the land. When it was finished, he went back into the mountain to live. After that they wanted another lot of water to come down from the north, throughout the country. It was the duty of Old Pundu, the Cod, to drag and create the river known as the Darling River today. Cod came out with his friend Mudlark, and they set off from the north and they created the big river, which flows right throughout the country, and into the sea now. (Dreamtime.net, The Creation Story, .2023)

This main Dreaming story is from one tribal group, but it is the beginning of many Dreaming stories, that other groups use to explain the origin and evolution of the land.

In comparison the Big Bang theory explains the evolution of the universe in incremental stages over billions of years, these being the heavy particle era, the light particle era, the radiation era, and finally the matter era.

The Jukurrpa seems to represent only one stage of the Big Bang theory, the matter era, and seems to explain it as an event that happened within a short time frame. Whereas the Big Bang theory explains the evolution of the Earth, planets and solar system as occurring over billions of years.

Additionally, the Big Bang theory states that the expansion of the universe will never stop and will continue for all eternity, continuing to make trillions of different galaxies and expanding so far away that our technology cannot comprehend it at this stage. This is like the Jukurrpa (Dreaming) which is believed to be a never-ending cycle of evolution and creation because the ancestral beings that the Indigenous peoples believed made the universe and earth are still living and creating and taking care of the earth we live on today. In essence they are the gods of nature.

The Jukurrpa and the Big Bang theory are both similar as they both have a starting point in which the universe is created, and that the expansion of the cosmos and our country are a never-ending cycle of evolution. They are different because one can explain the evolution over billions of years and the other shows that the country and the land we stand on is always changing. (The Dreaming.org,2023)

Science itself is meant to be questioned and as a result when a theory is developed scientists are always trying to prove themselves wrong. The Big Bang theory has been a widely accepted theory since 1931. It was hypothesised by Belgian cosmologist and Catholic priest, Georges Lemaître. Over many years, it has been peer reviewed and evaluated by many scientists such as Neil deGrasse Tyson, George Smoot, and Stephen Hawking. Although many scientists believe in the Big Bang theory, all the math, chemistry, and physics used today can't explain how it is possible, therefore we can only speculate on its existence. Another theory that helps support the existence of the Big Bang is the Cosmic Microwave Background Radiation which was proposed in 1948 by American cosmologist Ralph Apher. This occurred around 400 thousand years after the Big Bang, because in the early stages of the universe when it was just one-hundred-millionth the size it is today, its temperature was extreme (over 273 million degrees above absolute zero). Cosmic Microwave Background is the leftover radiation of the Big Bang, *"As the theory goes, when the universe was born it underwent rapid inflation, expansion and cooling."* (Space.com, CMB,2023). The Cosmic Microwave Background represents the heat leftover from the Big Bang and as a result we can see the "echo" of the expansion through the phenomenon (Howell & May, 2022; Space.com,2023). A counter theory to the Big Bang called

the Steady State Theory was hypothesised in 1948 by scientists Sir Hermann Bondi, Thomas Gold, and Sir Fred Hoyle. This theory states that as the universe is continuously expanding, it always maintains a constant average density, with matter continuously being created to form new stars and galaxies at the *“same rate that old ones become unobservable as a consequence of their increasing distance and velocity of recession.”*(Britannica, Steady State Theory,2023). This theory was disproved and has become supporting evidence for the Big Bang theory.

In conclusion, The Big Bang theory and the Jukuurpa, are related to each other, due to the fact they both have a beginning and middle, and are both seen to have an infinite continuum. The Big Bang theory, whilst there is plausible scientific evidence to support it, cannot unquestionably explain that our existence was formed through its eruption into the cosmos billions of years ago. Whilst the Jukurrpa, does not have specific scientific evidence, it is probable due to it being passed down orally through thousands of generations, and it is evident through the Indigenous hand paintings, and the connection and care for country enacted through the dances of the many tribes of the Aboriginal peoples. This is just one of the many mysteries of the universe.

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