Science Event:
The Big Bang

Time Frame: 13.8 billion years ago

The scientific descriptions on these pages are derived from AI investigations using ChatGPT and Gemini 3 asking about the beginning of the universe. The AI output has been revised appropriately for improved accuracy, ease of comprehension, and relevance to this study of Genesis 1.

Background: The Origin of the *Universe*

From the earliest days of human history, people have looked up at the night sky and asked some of the biggest questions imaginable: *Where did everything come from? How did the universe begin? Has it always existed, or did it have a starting point?* These questions appear in ancient stories, religious writings, myths, and early philosophies from cultures all around the world. For thousands of years, however, there was no way to test these ideas using experiments or measurements. The origins of the universe remained a matter of belief, imagination, and speculation.

This began to change in the late 1800s and early 1900s, when advances in mathematics, physics, and astronomy gave scientists new tools for studying the universe. Powerful telescopes allowed astronomers to observe distant stars and galaxies, while new theories - especially Albert Einstein's **General Theory of Relativity (also known as General Relativity)** - provided a way to understand how space, time, matter, and energy are connected. For the first time, scientists could use physical laws to study the universe as a whole, not just objects within it.

During the 20th century, a series of remarkable discoveries transformed humanity's understanding of the cosmos. Astronomers found that distant galaxies are moving away from us, showing that the universe is expanding. Physicists realized that if the **universe is expanding** today, it must have been smaller, hotter, and denser in the past. This led to the idea that the universe began in a hot, dense state approximately **13.8 billion years ago** - an event now known as the **Big Bang**.

Over time, many different branches of science contributed evidence supporting this model. Astronomers detected faint radiation left over from the early universe, called **cosmic microwave background radiation**. Physicists showed how the basic elements could have

formed in the universe's earliest moments. Observations of galaxies, stars, and large-scale cosmic structure all fit together within the same framework. What had once been philosophical questions about origins were now being addressed through careful observation, mathematics, and experimentation.

Today, the Big Bang theory stands as one of the most important scientific explanations ever developed. While it does not answer every question, it has allowed humanity to understand *how* the universe has changed over time with remarkable precision. In just one century, questions that puzzled thinkers for thousands of years moved from the realm of mystery into the realm of science, demonstrating the power of human curiosity and the scientific method.

- **Time Frame:** 13.8 Ga
- **Evidence:** Numerous scientific observations have supported General Relativity, which is the best model that we have for the origin and physical history of the universe and is the basis for understanding the Big Bang. These scientific observations include the expansion of universe as observed by astronomers, the cosmic microwave background radiation observed by radio telescopes, the observed abundance of light elements like hydrogen and helium, the large-scale structure of galaxies, and the fact that the age measurements of astronomical objects are consistent with one another.

Overview of the Big Bang Theory

The **Big Bang** is the scientific idea about how our universe began. It doesn't describe an *explosion in space* - it describes an *expansion of space itself*. It is based on or General Relativity, which predicts this expansion of the universe. If we mathematically solve the equations of General Relativity back to the origin of that expansion, then there would be a mathematical singularity about **13.8 billion years ago**. A singularity is where the theory predicts infinite values, such as division of a number by zero. No theories have been successful at getting around the singularities predicted from General Relativity. And since General Relativity has correctly predicted so many phenomena, the beginning of the universe is currently modeled similar to a singularity, as a single point that was incredibly tiny, unbelievably hot, and extremely dense. There were no stars, no planets, no atoms, not even light the way we know it. Just energy.

Then, suddenly, this point began to **expand**. Space itself stretched out, cooling down as it grew. This event is what scientists now refer to as the Big Bang. The universe is **still expanding today**, and scientists can measure this expansion with telescopes. Light from far-away galaxies shows us that space is stretching even now.

A Simple Way to Imagine It

Imagine a balloon with tiny dots drawn on it. As the balloon inflates, the dots move farther apart. The dots aren't moving on their own—the *space between them* is growing.
The universe works in a similar way.

What Happened After the Big Bang?

As the universe expanded and cooled:

1. **Energy turned into tiny particles**
   These particles are the building blocks of everything—like protons, electrons, and neutrons.
2. **Particles joined together to form atoms**
   The first atoms were mostly hydrogen and helium.
3. **Gravity pulled atoms together**
   Over millions of years, clouds of gas formed. These clouds collapsed to make **stars**.
4. **Stars gathered into galaxies**
   Our own galaxy, the **Milky Way**, is one of billions.
5. **Inside stars, heavier elements were made**
   Elements like carbon, oxygen, and iron formed inside stars and spread out when some stars exploded as **supernovae**.
6. **Planets eventually formed**
   Including Earth, which formed about 4.5 billion years ago.

Description in Genesis 1 of This Event

In the beginning God created the heavens and the earth.
Genesis 1:1 (NIV)

These are some of the most famous words that have ever been written. And these words align very well with what science has found as the beginning of our universe with the Big Bang. However, the familiarity of this statement should not allow us to miss how profound and uncommon this statement is among religions and human thought.

The Creator is Separate from Creation

First of all, this describes a Creator who is outside of the creation. There is nothing about a being that is created out of something else or was there in the midst of some other physical environment, as is the case with many other origin stories. The Genesis 1 description tells about one Supreme Being who is responsible for creation out of nothing. The early Hebrew language in which Genesis 1 was written did not have a word for *universe* as we understand it today. So, *the heavens and the earth* would have been the best way to describe what we now call our *universe*.

Also, this passage is clear and consistent throughout the Bible in stating that there was one beginning to our physical universe. Other religions are oftentimes not as clear in their origin stories about one or multiple beginnings.

This passage is also the beginning of the unique story of how the Creator values the creation and saw that it was good. And when the Creator made man and woman as the pinnacle of creation and had finished the creation, then the Creator said that it was *very good*. The Genesis story also points out that being the pinnacle of creation is both a privilege and a responsibility that we have to care for God's creation and manage it well.

Value of Learning from both the Bible and Science

Combining the Genesis 1 origin story with the findings of science also shows the benefits of cross-pollination between science and the Bible. For example, the General Theory of Relativity that was discovered by the famous scientist Albert Einstein formed the foundation of the Big Bang theory. And according to the General Theory of Relativity then the Big Bang was not only the beginning of the universe, but it was the beginning of space and time itself. Because as finite creatures we live within space and time, then we really cannot fully comprehend what it means to say something exists beyond space and time.

But through combining General Relativity with Biblical passages like Genesis 1:1, we have the added insight from science that the Bible is telling us about an event that truly was from an unfathomable and breathtaking God. How Great Thou Art!