

The Expanding Universe

In the 19__s, an American astronomer named Edwin _____ confirmed that many _____ exist beyond the Milky Way. He also found that almost all galaxies are moving _____ from each other. These observations helped scientists conclude that the universe is _____. Scientists have also determined that the universe is _____ at an increasing rate. Basically, the speed at which galaxies are moving away from the centre of the universe is _____.

	Distances between Galaxies During Universal Expansion			
	Circumference	From A to B	From B to C	From C to A
Round 1				
Round 2				
Round 3				
Round 4				

Evidence for the Big Bang Theory

Hubble used the light _____ of each galaxy he studied to determine the _____ at which each galaxy was moving away from the Milky Way. Hubble discovered a clear relationship between the speed and _____ of each galaxy. Specifically, he found that the further away a galaxy was, the _____ it was moving away.

This evidence, along with that of many other scientists, supported the notion that the universe is expanding, and helped develop the _____.

The Big Bang Theory

The Big Bang Theory states that the universe formed when an _____ dense point suddenly and rapidly expanded in a single moment. All of the _____ and _____ that exists today was created during the early _____ of that hot, rapid _____.

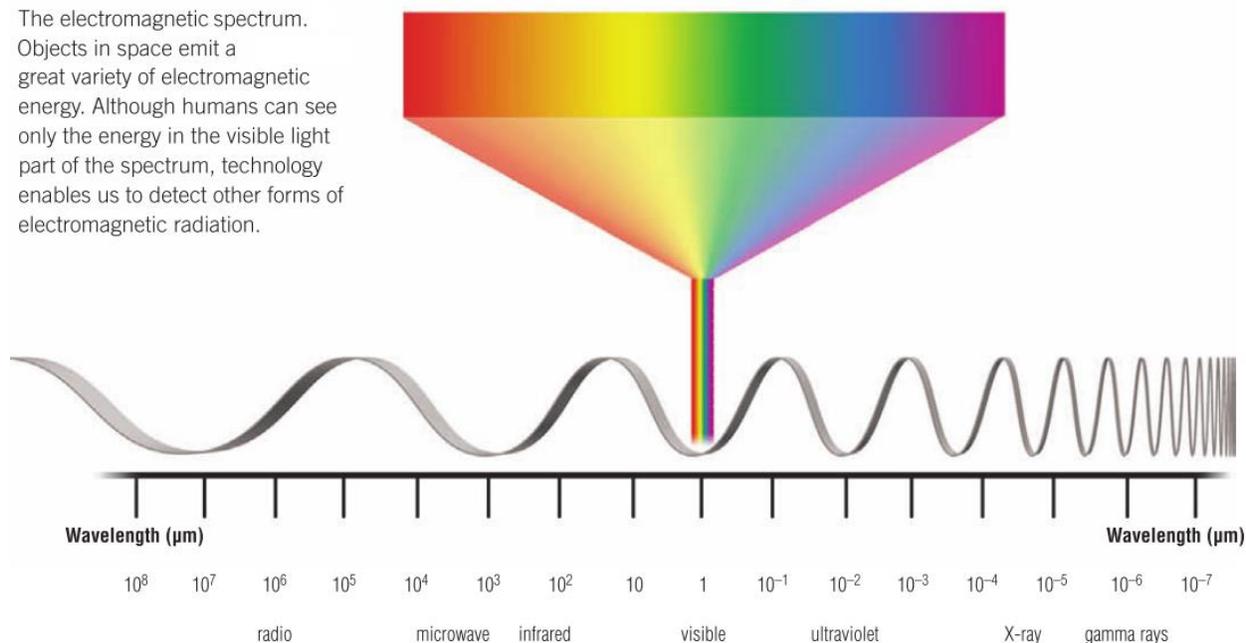
The Big Bang Theory also posits that the universe formed _____ years ago. Today, at several research facilities around the world including _____ in Switzerland, scientists are trying to re-create various aspects of the conditions that might have existed in the early moments of the _____.

The Wave Nature of Light

Light is a form of energy that travels in _____ and is also known as _____ radiation. Visible light is electromagnetic radiation that we can _____. Other forms of electromagnetic radiation include _____ waves, _____ waves, _____ radiation and ___-rays.

When visible light rays are split into a _____ of colours, the result is called the electromagnetic spectrum, as shown below.

The electromagnetic spectrum. Objects in space emit a great variety of electromagnetic energy. Although humans can see only the energy in the visible light part of the spectrum, technology enables us to detect other forms of electromagnetic radiation.



The figure above shows the full electromagnetic spectrum, starting with _____ waves with very long wavelengths. Each of the colours of the visible light spectrum, from _____ through to yellow and green and on to violet, varies in _____.

The wavelength of red light is _____ than the wavelength for blue light. This distinctive characteristic gives astronomers a way to analyze light from _____ and _____.

While observing the light given off by various _____, astronomers noticed that every galaxy showed a spectral shift toward the _____ end of the colour band. This phenomenon, called a _____ can only occur when objects are moving _____ from the observer at very high speeds.

This discovery tells us that the galaxies we see in the universe are moving _____ from us at very high speeds and gives further evidence that the universe is _____.