Origins of the Universe

“Cosmos”

-Record 5 big ideas

Timeline of the Universe CHALLENGE!

-Using supplies and links provided, create a timeline of the universe from the Big Bang until now

-Must have a regular scale

-Must work with at least 1 other person

-Must be neat and legible

-Must include the ten events on the following slide...

Required Events

Birth of the Milky Way Galaxy (300,000,000 years after the BB/13 billion years ago)
Birth of the sun (5 billion years ago)
Birth of the Earth (4.6 billion years ago)
Life on Earth begins (3.8 billion years ago)
Extinction of Dinosaurs (65 million years ago)
Homo Sapiens Evolve (600,000 years ago)

Big Bang Evidence

The Theory of General Relativity (1905-1917):

-Expanded Newton's Laws of gravity to describe fast-moving objects and energy in space.

-Describes the gravity of large objects in space

-Describes how the gravity of large objects in space act on each other.

-Light seems "bends" as it travels at high speeds through space.

Big Bang Evidence

Hubble's Observations (1929):

-Clusters of stars in space are actually organized into galaxies.

-Those galaxies are moving further away.

-The farther away the galaxy, the faster it's moving away.

-Observed by analyzing the wavelengths of light coming from galaxies.

Early Elements

-In the first ~400,00 years after the Big Bang, there were free-floating particles (protons, neutrons, electrons, etc)

-It was really, really, really hot

-As it cooled, the particles fused together to form mostly Helium and Hydrogen, with some Lithium

-The amounts of these elements formed early on supports the idea of a mega explosion, and then fast cooling.

Cosmic Microwave Background Radiation

-The Big Bang was REALLY REALLY HOT ~273 million degrees F.

-Radiation was released in those first ~300,000 years.

-Since it was so hot, and there was so much radiation, we can still find and measure it, though it's now only about 32 degrees F.

-Scientists like to be fancy, so they call it "Cosmic Microwave Background Radiation!

WMAP

-Wilkinson Microwave Anistropy Probe

-Fancy space radiation thermometer.

-Used to find and measure cosmic background radiation

-From 2001-2011, found that CBR decreased according to a pattern.

-That pattern fits with the idea that a mega-explosion happened 13.77 BYA, and the radiation from it has been spreading out ever since.