



12 ATAR Physics

Hubble's Law (Part 1) 2019

Name: _____

Mark: 27

The Big Bang Theory & Hubble's Law

The Big Bang Theory is the prevailing cosmological model for the universe from the earliest known periods through its subsequent large-scale evolution. The model accounts for the fact that the universe expanded from a very high density and high temperature state (called a singularity) and offers a comprehensive explanation for a broad range of phenomena, including the abundance of light elements, the cosmic microwave background, large-scale structure and Hubble's Law.

Since Georges Le Maître first noted, in 1927, that an expanding universe might be traced back in time to an originating single point, scientists have built on his idea of cosmic expansion. In 1929, from analysis of galactic redshifts, Edwin Hubble concluded that galaxies are drifting apart. This is important observational evidence consistent with the hypothesis of an expanding universe.

1. Research the following points, including appropriate formulae.

- What is Hubble's Law and how was it determined?
- What did Hubble find about the expanding universe?
- How was the Doppler effect important in Hubble's work? Include information about "red-shift" and its measurement.
- How can Hubble's Law be used to calculate the age of the universe?
- How is the recessional velocity of a galaxy calculated?
- What is the currently-accepted value for Hubble's constant?

2. Use the table below and your digital device to collect your data. This data will be required for completion of the second stage of this investigation.

https://en.wikipedia.org/wiki/NGC_5001

New General Catalogue (NGC) Table

NGC #	Distance ($\times 10^6$ ly)	Recessional Speed (kms^{-1})	Distance (Mpc)
5005			
5010			
5055			
5078			
5248			
5408			