



12 ATAR Physics

Hubble's Law (Part 1) 2018

Name: _____

Mark: 55

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. Show how the mathematics of Hubble's Law can be used to calculate the age of the universe. [3 marks]

2. Explain how the recessional velocity data is collected. [4 marks]

3. Use the table below and your digital device to collect your data. This data will then be required for completion of the second stage of this investigation. Leave your data table with your teacher. You will be able to collect it at the start of part 2.

[10 marks]

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

New General Catalogue (NGC) Table

NGC #	Type of object	Redshift (z)	Distance (ls)	Recessional Speed (kms ⁻¹)	Distance (Mpc)
5005					
5010					
5055					
5068					
5078					
5090					
5112					
5170					
5236					
5248					
5364					
5408					

H – R Diagrams: Classifying and evolution of stars

Now watch this You-tube video and make notes for the next part of this investigation.

https://www.youtube.com/watch?v=UwW_FbPE1R8

Points to cover:

- How are stars classified?
- How does temperature affect the classification of stars?
- How does apparent magnitude affect the distance from a star?
- What factors affect the life-cycle of a star?

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