**Chapter 13 – The universe and its stars**

**13.1 – The origin of the Universe**

Hubble space telescope is named after \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Edwin Hubble is known for two major discoveries

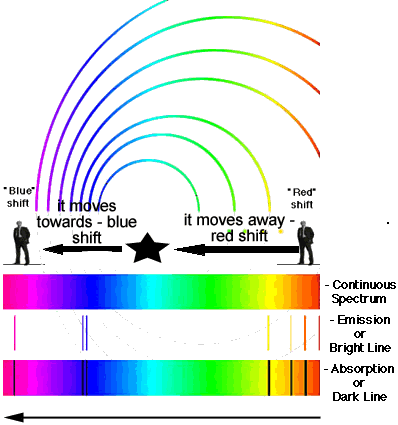
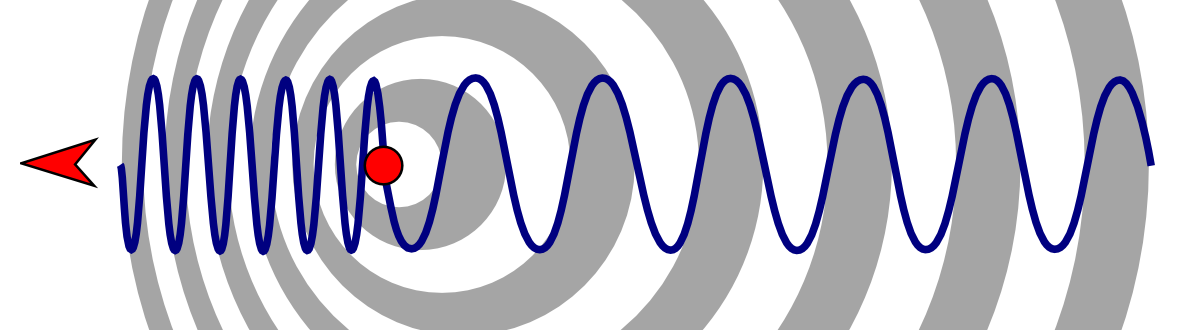
a)

b)

Evidence for an expanding Universe

a) Red shift

light from galaxies appears to be shifted towards the red end of the spectrum



Picture from:

<http://www.arm.gov/news/blog/post/18689> (above)

<http://www.cyberphysics.co.uk/topics/space/redshift.htm> (left)

b) Background Radiation

* 1965 – researchers used \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ antenna and found radiation coming from all directions
* Today this is believed to be a remnant of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* The radiation is believed to have a temperature of \_\_\_\_\_\_\_\_\_\_\_\_\_\_C and correspond to an age of \_\_\_\_\_\_\_ billion years
* Further evidence was gathered by the COBE ( Cosmic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) and WMAP (Wilkinson Microwave Anisotropy Probe)
* COBE and WMAP provide evidence that supports the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Scientists can now pinpoint when and where stars and galaxies formed based on the differences in radiation temperature and density shown by COBE and WMAP
* The universe is believed to be about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ billion years old