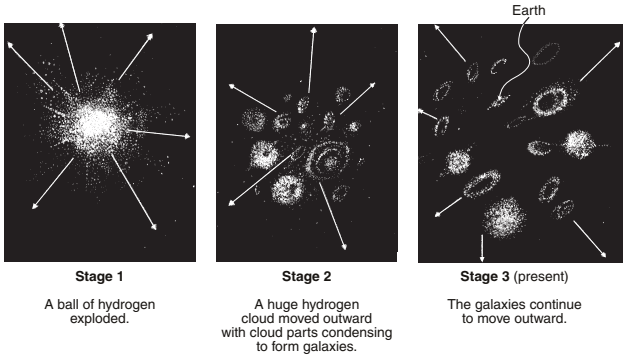
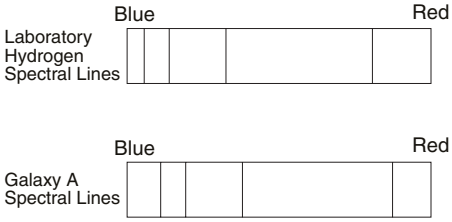
Astronomy Part 1: The Universe, Galaxies, and Stars Review Sheet

The Universe

- The Universe is everything, all matter, energy, and space.
- The Big Bang Theory explains the origin of the Universe. It states that the Universe began as an extremely small, hot, dense point called a singularity. Approximately 13.7 billion years ago, this tiny point rapidly expanded, forming the Universe as we know it today.
- The Big Bang Theory is supported by two pieces of evidence which include:





1. The light emitted by most galaxies is red-shifted, meaning the galaxies are moving away and the Universe is expanding. This means than, if you go back in time, the Universe was smaller and smaller.
2. We observe faint cosmic background radiation in the form of microwave energy emanating in all areas of space. We believe this is "left-over" radiation from the Big Bang, or the echo of the Big Bang.

Galaxies

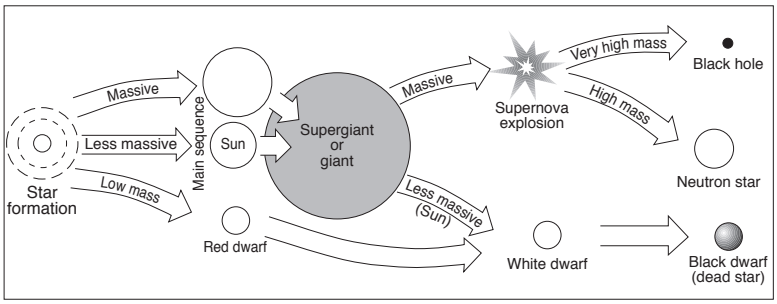
- A galaxy is a cluster of billions of stars held together by gravity.
- Galaxies are classified according to their shape. The three main shapes include spiral, elliptical, and irregular.
- Our star, the Sun, the Earth, and the rest of our solar system lies in one of the spiral arms of the Milky Way galaxy.

Stars

- A star is a massive ball of gas that creates its own energy through the process of nuclear fusion.
- Nuclear fusion is a reaction in which lighter elements combine to form heavier elements, in the process releasing huge amounts of energy.

Hydrogen (lighter element)	+	Hydrogen (lighter element)	→	Helium (heavier element)	+	Energy

- A star's life-cycle and characteristics depend on its mass. High mass stars are hotter, live shorter lives, and have more violent deaths. Low mass stars are cooler, live longer lives, and have quiet deaths.



- The Sun is as average sized, middle-aged star. It is said to be on the Main Sequence, meaning it is in the active part of it's life.
- The Sun, like many stars, is currently fusing Hydrogen in to Helium.
- The Sun formed, along with the Earth and out solar system, approximately 4.6 billion years ago.
- The Sun will likely live for another 5 billion years, before swelling in to a Red Giant, then shrinking and dying as a White Dwarf.

IN THE ESRT... The Electromagnetic Spectrum (p. 14), Characteristics of Stars (p. 15)