Introduction
The Universe is Filled with

Planetary Like Objects
Stars and Star Clusters
Nebulae
Supernovae
Galaxies and Quasars
Pulsars and Black Holes
Astronomy is the study of these and other similar objects
Planetary Objects
Star Clusters
Nebulae
Supernovae
Galaxies
Why Study Astronomy

Astronomy has shaped our view of the Universe
Influence on civilization, culture, and society
Excellent subject to learn how science works
Science in Astronomy is applicable across disciplines
Study of other planets can yield essential knowledge as to how our own planet functions and behaves
But Why Study The Objects?

They yield clues to

- The method of formation of the planets and stars
- The origins of the Universe
- The fate of the Universe
A Brief History of Time

13.7 Billion Years Ago  The Big Bang
13.5 Billion Years Ago  First Light – First Stars Ignite
13.5 – 1 Billion Years Ago  Quasars – Very Active Galaxies
10 Billion Years to Now  Active Galaxies
4.6 Billion Years Ago  Birth of the Solar System and the Earth
3.5 Billion Years Ago  Large Asteroid Impact – Destroyed all Life
3 Billion Years Ago  Earliest Record of Life – Australian Bacterial Fossils
67 Million Years Ago  Extinction of Dinosaurs by Asteroid Impact
7 Million Years Ago  Hominid in Africa
Universe Vast in Scales

• **of TIME**
  – Age of a person 75 years
  – Age of civilization on Earth 3000 years
  – Age of Solar System 5,000,000,000 Years
  – Age of Universe 14,000,000,000 Years

• **and of DISTANCE**
  – Atomic Nucleus $10^{-13}$ cm
  – Human 200 cm
  – Earth $1.3 \times 10^9$ cm
  – Sun-Earth Distance $1.5 \times 10^{13}$ cm
  – Milky Way Galaxy $9 \times 10^{22}$ cm
  – Universe $>10^{28}$ cm

• **Powers of Ten Movie**
In spite of the vast scales

The Macroscopic Workings are easily understood in terms of Newtonian Mechanics

The information we gather is by way the light, electromagnetic radiation, reaching us
Astronomy is a mix of many sciences

- Physics
- Chemistry
- Geology