

## Universe & Galaxies – NOTES

What is the \_\_\_\_\_-?

- Everything, everywhere at all times
- Everything Out There!!!
- Including the \_\_\_\_\_, planets, \_\_\_\_\_, galaxies, and all that they contain; the entire \_\_\_\_\_

Galaxies:

- A group of stars, \_\_\_\_\_ and dust held together by gravity
- Groups Of Stars & \_\_\_\_\_ matter

Types of Galaxies:

3 Shapes:

- \_\_\_\_\_ **galaxies** – oval or football shaped  
older than spiral-little dust or gas, reddish tint
- \_\_\_\_\_ **galaxies** – spiraling disk with bulging center (spiral arms extending outward) –our galaxy-the **milky way**- \_\_\_\_\_ tint  
The Milky Way is an \_\_\_\_\_ of a spiral galaxy
- **Irregular Galaxies**- no well defined shape – many different shapes and are \_\_\_\_\_ and less common than the others

Light Years

- We measure distances in the universe beyond the earth we need big units. Hence the light year.
- A light-year is a \_\_\_\_\_ used by astronomers to measure interstellar distance (the distance between \_\_\_\_\_).
- A light-year is defined as the distance that light will travel in a year
- **WARNING: IT IS NOT A UNIT OF TIME.** It is a unit of \_\_\_\_\_.
- Distance of 1 light year =  $9.5 \times 10^{15}$  M. or 9,500,000,000,000,000
- Light travels at 671,080,887.616 mi/hr

Big Bang Theory – \_\_\_\_\_ of the Universe

- Explosion of concentrated matter that has been expanding ever since
- The universe was created sometime between \_\_\_\_\_ billion and 20 billion years ago from a cosmic explosion that hurled \_\_\_\_\_ in all directions
- \_\_\_\_\_ pulled matter into clumps that formed galaxies
- Giant Explosion that began space and time.

Support for Big Bang Theory

Red Shift - Shows that the universe is expanding.

- \_\_\_\_\_ waves get bigger and stretch out, as they move away and shift towards the red end of the spectrum.

### Cosmological Redshift

- Discovered by \_\_\_\_\_
- Stars emit light in patterns. Hubble found that light is moving toward red end of spectrum
- This is due to the fact that the light source is \_\_\_\_\_. Hence the universe is expanding
- The distance between objects is getting \_\_\_\_\_

### Cosmic Radiation

- Cosmic radiation is a collection of many different types of radiation from many different types of sources
- Can detect microwaves left over from explosions.

### Theories for the Future

- 1. Keep expanding \_\_\_\_\_.
- 2. Reach a certain \_\_\_\_\_ and stop.
- 3. \_\_\_\_\_ back on itself “Big Crunch”