

**Practice Test: ES-5 Galaxies****Multiple Choice**

Identify the letter of the choice that best completes the statement or answers the question.

Light Years

\* The distance between stars and galaxies in the universe is so vast it would be unwieldy to describe it in miles—like measuring the distance from New York to Tokyo in inches!

\* Instead, scientists use light-years to **measure distances in space**. This sounds like a unit of time, but a light-year is actually a distance: **the distance that light travels in one year**.

\* But how far **exactly** is a light-year?

\* Light travels 186,000 miles per second.

\* There are 60 seconds in a minute, 60 minutes in an hour, 24 hours in a day, and 365 days in a year.

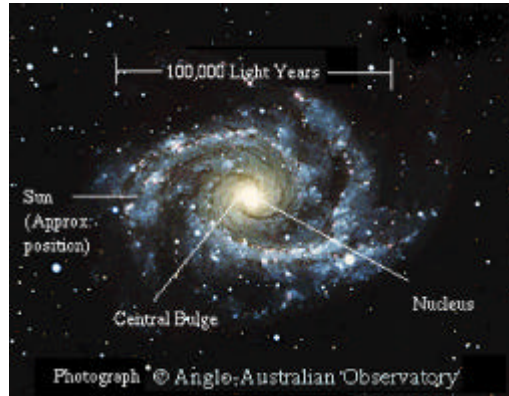
\* Multiply these together to get 31,500,000 seconds in a year.

\* Multiply that times 186,000 miles per second and you get 5,850,000,000,000 miles—about **6 trillion miles**.

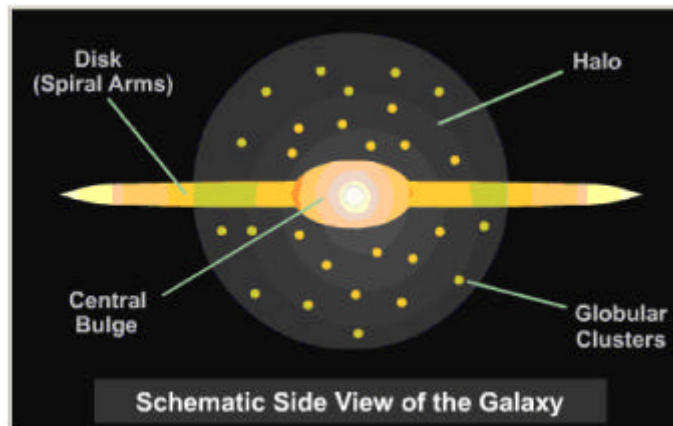
- \_\_\_\_\_ 1. A light year is \_\_\_\_\_.
- a. the distance that light travels in one year (6 trillion miles)      b. the length of a football (100 yards)
- \_\_\_\_\_ 2. Astronomers studying the Universe use the light year instead of kilometers or miles, because \_\_\_\_\_.
- a. the distances between objects in the Universe are not measurable.      b. the distances between objects in the Universe are very large.

### The Milky Way Galaxy

- \* A galaxy is composed of gas and millions of stars held together by gravity.
- \* All that you can see in the sky (with a very few exceptions) belongs to our **Milky Way galaxy**—a system of roughly 200 billion stars.



- \* The **sun** is about 26,000 light-years from the center of the Milky Way galaxy, which is about 80,000 to 120,000 light-years across (and less than 7,000 light-years thick).
- \* We are located on one of the Milky Way Galaxy's **spiral arms**, out towards the **edge**.
- \* It takes the sun (and our solar system) roughly **200-250 million years** to **orbit once** around the Milky Way.
- \* In this orbit, we (and the rest of the Solar System) are traveling at a **velocity** of about **155 miles/sec** (250 km/sec).



**Most** of the stars in the Milky Way Galaxy are located in the **disk (spiral arms)**. This is the site of **most** of the **star formation** because it contains lots of **gas** and **dust**.

**Halo** - The **halo**, which is a spherical cloud surrounding the disk, contains only about 2% as many stars as the disk. It contains **old and cool stars**, since it has little gas and dust.

**Globular Cluster** - A **globular cluster** is a spherical bundle of stars (star cluster) that orbits a galaxy as a **satellite**. Globular clusters are very **tightly gravitationally bound**, which gives them their spherical shape, and **extremely dense** (in relative terms) towards their core.

**Nuclear/ Central Bulge** - The **nuclear/central bulge** or core contains the **highest density of stars** in the galaxy. **Some hot young stars** may be found in the nucleus, but the **primary population of stars** in the nucleus is **similar to the old stars found in the halo**.

At **visible wavelengths** the core of the galaxy is **difficult to detect**. (Due to the presence of dust, gas, and stars.)

We can observe the core at **other wavelengths** and have found **some evidence** that **violent processes** may be taking place there. Many galaxies may contain very massive **black holes** at their cores, and our own galaxy may be no exception.











**Practice Test: ES-5 Galaxies**  
**Answer Section**

**MULTIPLE CHOICE**

1. A
2. B
3. B
4. A
5. A
6. B
7. A
8. B
9. A
10. A
11. A
12. A
13. B
14. B
15. A
16. A
17. A
18. B
19. A
20. B
21. A
22. B
23. A
24. B
25. B