

Lect 8: Chapter 19, Section 3: Galaxies

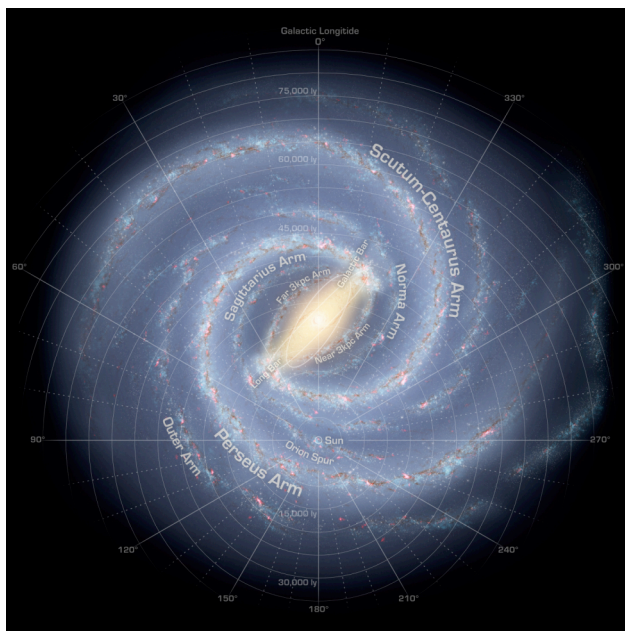
1 pt ec

What is a galaxy?

So now that we've talked about stars, it is time to discuss how these stars are organized in the universe. A galaxy is a huge group of stars, dust, gas, and other objects bound together by gravity. Galaxies come in a variety of sizes and shapes. The largest galaxies have trillions of stars, others have only a few million. Edwin Hubble, the astronomer for whom the Hubble Space telescope is named, began classifying galaxies in the 1920s.

Our Galaxy: The Milky Way

- barred-spiral galaxy
- about 12-14 billion years old
- It is 100,000 light years across
- the bar in the center extends about one-third the diameter of the galaxy
- Our sun sits about 26,000 light years from the center of the disk - on one of the spiral arms
- Astronomers think there is a giant black hole at the center
- When you look up at the sky, you can see the milky way band going across.
- We are looking in from the edge

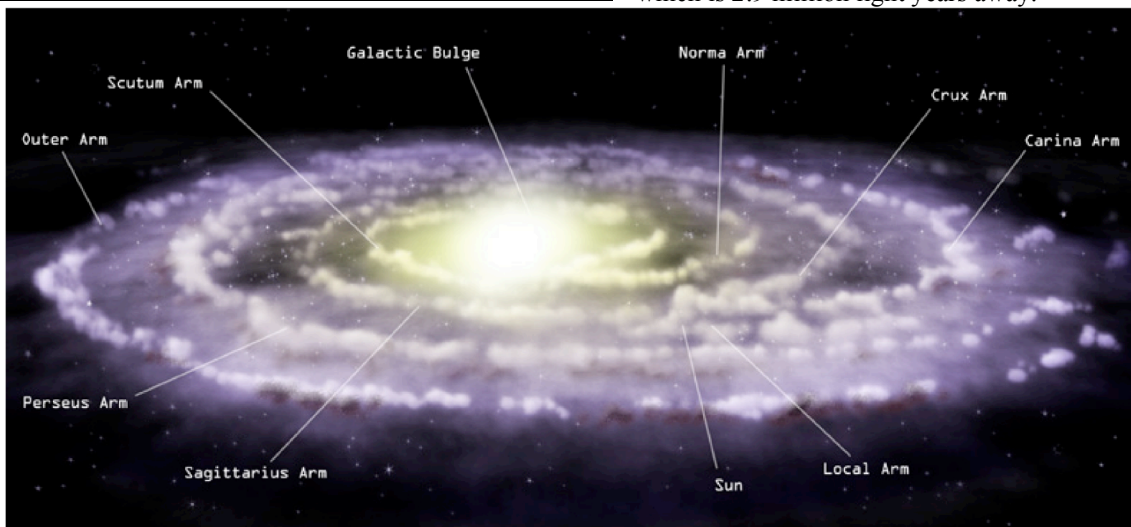


5 types of Galaxies	Draw a Picture
<p>1. <u>Spiral</u> Galaxy: Looks like a <u>spiral</u> - central dense area surrounded by spiraling arms, Most common type, Central region is yellow: made up of cooler stars, Outer arms are blue: made up of new stars</p>	
<p>2. <u>Spiral</u>-Spiral Galaxy: A spiral galaxy with a <u>bar</u> structure in the middle, Sometimes have just <u>one</u> spirals, or "arms"</p>	
<p>3. <u>Spiral</u> Galaxy: Looks like the middle part of a spiral galaxy, but without the arms. Some astronomers think these are actually spiral galaxies, but we're looking at them sideways & can't see the arms.</p>	
<p>4. <u>Elliptical</u> Galaxy: <u>Elliptical</u> with a smooth, even distribution of stars, No central dense region</p>	
<p>5. <u>Irregular</u> Galaxy: Don't fit into any other classification, Do not appear to rotate</p>	





Our closest neighbor is Proxima Centauri, a star. It is about 4.2 light years from Earth. Even though it is close, it is a tiny red dwarf with a luminosity of 0.006 - so it's hard to see.

At this time, the Voyager spacecraft are the only manmade objects to leave the Solar System. Launched in 1977, they should reach the edge of the Solar System by 2015. At this pace, they will need to travel another 82 thousand years before reaching the closest star. The closest galaxy is called the Sagittarius Dwarf. It is a little over 78,000 light years away. If it would take us thousands of years to reach the closest star, you can only imagine how long it would take to reach the closest galaxy.





The milky way belongs to a group of about 30 galaxies called the local group. This group includes the Large Magellanic Cloud & the Small Magellanic Cloud. It also includes the Andromeda Galaxy, which is 2.9 million light years away.



Brain POP[®] GALAXIES

- The light from a star moving away from us would be experiencing:
 - Redshift
 - Blueshift
 - Greenshift
 - Whiteshift
- What force causes galaxies to move away from one another?
 - Electromagnetic force
 - Gravity
 - Friction
 - Energy left over from the Big Bang
- Which of the following happens before a black hole comes into existence?
 - Gravity ceases to exist in a certain region of space
 - A new star is born at the center of a galaxy
 - An old star collapses in on itself
 - The fabric of spacetime is ripped by a star or planet
- About how old do scientists think the universe is?
 - 14 million years
 - 140 million years
 - 14 billion years
 - 140 billion years
- Astronomers categorize galaxies into a handful of basic shapes. What can you conclude from this fact?
 - Galaxies all come from the same planetary nebula
 - Galaxies are generally all formed by the same forces
 - The number of stars in a galaxy determine its shape
 - All galaxies have about the same number of stars
- Which of the following represents an elliptical galaxy?
 - 
 - 
 - 
 - 
- From the information presented in the movie, what can you conclude about dark matter?
 - It is made up of black holes
 - It holds a lot of the universe's mass
 - It's solid, not liquid or gaseous
 - Planet Earth contains trace fragments of it
- How are elliptical galaxies different from spiral galaxies?
 - They contain older stars and less gas and dust
 - They contain younger stars and more gas and dust
 - They are bigger than spiral galaxies
 - They are smaller than spiral galaxies
- What would happen to galaxies without gravity?
 - They would spin faster
 - They would contain stronger black holes
 - They would contain more stars
 - They would fall apart
- Which of the following is a true statement about irregular galaxies?
 - They are older than other types of galaxies
 - They all contain massive black holes at their centers
 - They contain relatively little gas and dust
 - They consist mainly of young stars

Brain POP[®] MILKY WAY

- What force keeps the arms of the Milky Way spinning around its center?
 - Friction
 - Gravity
 - The strong force
 - Nuclear force
- What might happen if you got too close to the center of the Milky Way galaxy?
 - You would be burned up by the galaxy's brightest stars
 - You would be spun outward toward the edge of the galaxy
 - You would be trapped in the gravitational pull of a black hole
 - You would find yourself traveling faster than the speed of light
- How do the stars in the halo of the Milky Way differ from the stars in the arms?
 - The stars in the halo are older
 - The stars in the halo are brighter
 - The stars in the halo are more massive
 - The stars in the halo have a stronger gravitational pull
- Which term best describes dark matter?
 - Luminous
 - Transparent
 - Obvious
 - Mysterious
- Which choice best depicts the shape of the Milky Way?
 - 
 - 
 - 
 - 
- Why is our galaxy called the Milky Way?
 - Because of its dense, fluid center
 - It's a translation of an ancient name for "galaxy"
 - Because it's relatively homogeneous
 - Because it looks hazy and milky from Earth
- How is the center of the Milky Way different from the arms?
 - The center is fairly flat, while the arms form a bulge
 - The center is a spherical bulge, while the arms are relatively flat
 - The center contains stars, while the arms contain only gas, planets, and dust
 - The center contains dark matter, while the arms do not
- What has to happen for a black hole to form?
 - A planet must collapse inward on itself
 - A galaxy must spin extremely fast around its center
 - A large star or group of stars must collapse
 - Two stars must collide with one another
- If you were giving directions to an alien from another galaxy, how would you tell him to locate Earth?
 - Tell him to visit the Orion arm
 - Tell him to visit the Sagittarius arm
 - Tell him to visit the Perseus arm
 - Tell him to visit the central bulge
- What is a galactic year?
 - The time it takes the Earth to make one revolution around the sun
 - The time it takes for one arm of the galaxy to move ninety degrees
 - The time it takes for the sun to orbit around the center of the galaxy
 - The time it takes for the moon to make one revolution around the earth