

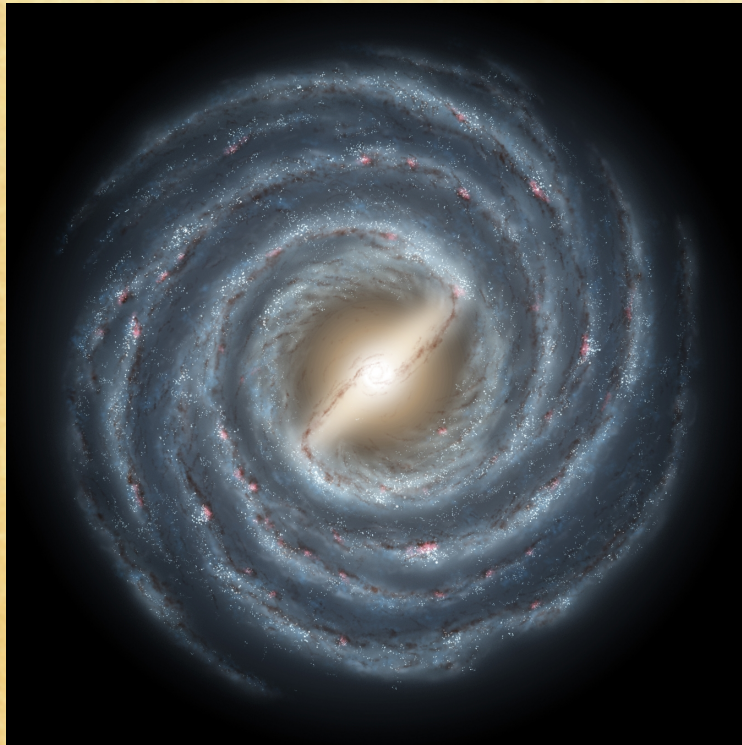
# What Makes Up the Universe

Chapter 9 Lesson 3  
Part 2

ByDesign Science, Level 4  
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# Galaxies



- ♦ A galaxy is a huge system containing hundreds of billions of stars held together by gravity.
- ♦ The Milky Way is the galaxy that our Solar System is part of.
- ♦ It contains over 100 billion stars



# Galaxies

- ♦ Its diameter is about 100,000 ly across.
- ♦ The parts of the Milky Way we can see from Earth look like a bright band of light stretching across the night sky.





# Galaxies





# Galaxies

- ♦ Our Sun and its family are found in one of the spiral arms.
- ♦ It is about two-thirds of the way from the center of the Milky Way.
- ♦ We cannot see the center because it is hidden by dust and gas.
- ♦ The entire Milky Way rotates in space.





# Galaxies

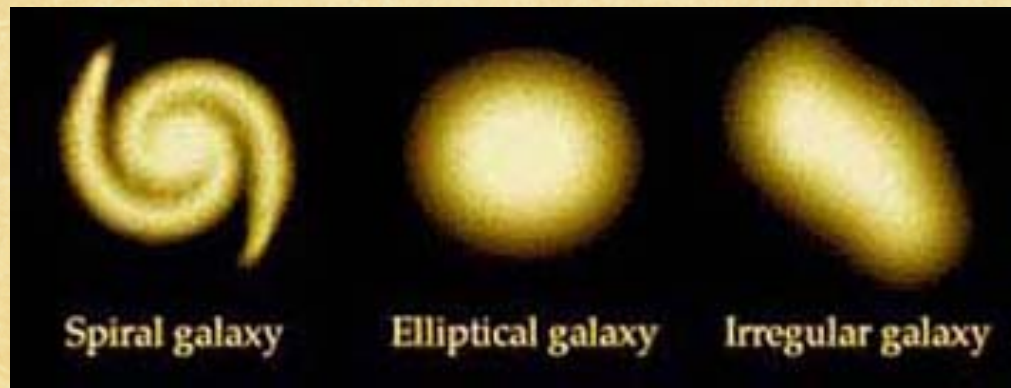
- ♦ Our closest neighboring galaxy is the Andromeda galaxy.
- ♦ It lies about 2.3 million ly from the Sun.





# Galaxies

- ♦ Astronomers classify galaxies by shape.
- ♦ The three main galaxy shapes are spiral, elliptical, and irregular.





# Galaxies

## Spiral Galaxy

- ♦ Pinwheel shape
- ♦ Center bulge with long spiral arms
- ♦ Milky Way is example





# Galaxies

## Elliptical Galaxy

- ♦ Oval in shape





# Galaxies

## Irregular Galaxy

- ♦ Odd shape or no regular shape



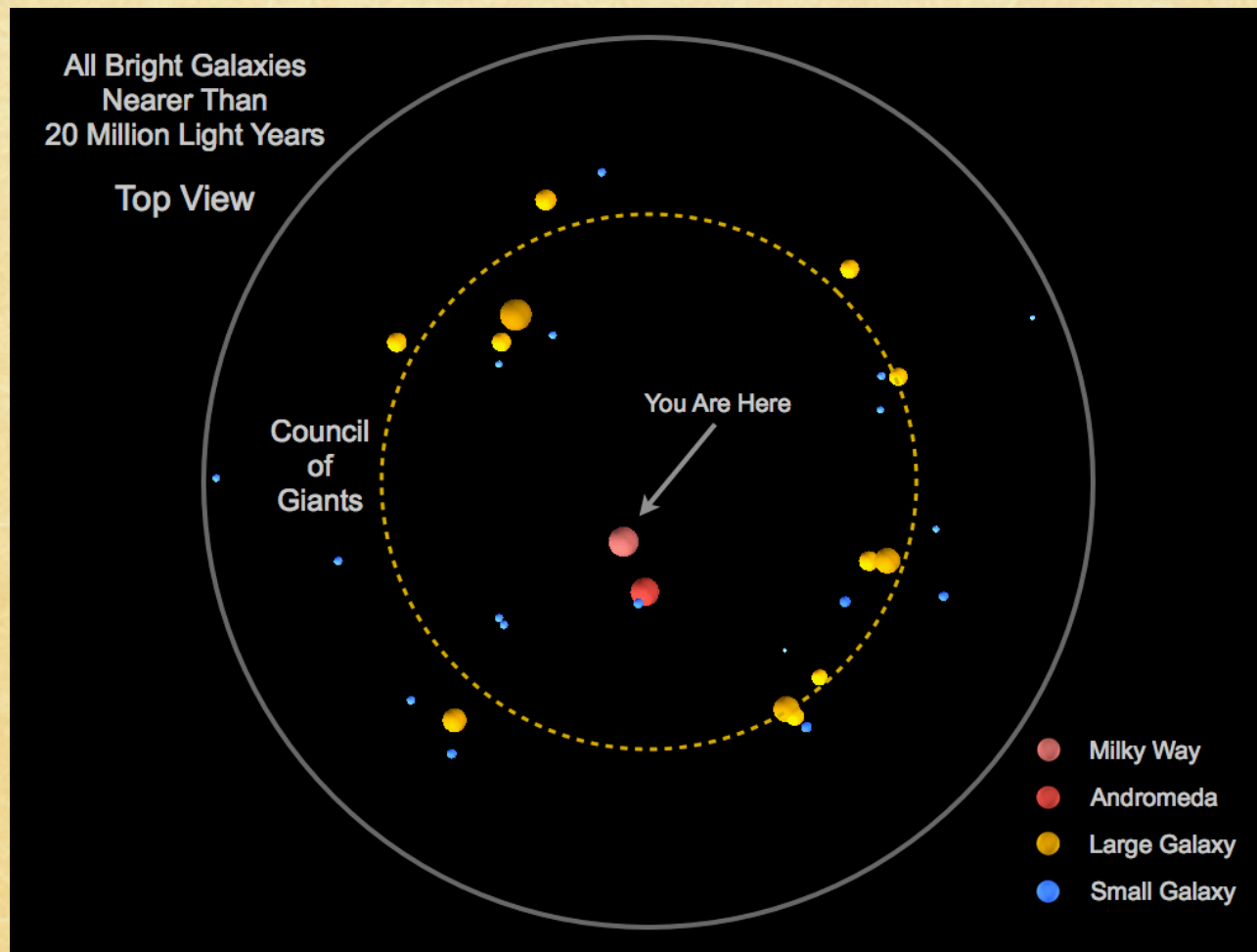


# Galaxies

- ♦ Galaxies often move together in groups called clusters.
- ♦ The Milky Way is part of a cluster called the *Local Group*.
- ♦ It is made up of about 30 to 40 other galaxies, including Andromeda.
- ♦ The Local Group is part of a larger group called the Virgo supercluster, which may have up to 2,000 galaxies.



# Galaxies





# The Universe

- ♦ As large as the Milky Way seems to us, it is small in comparison with space.
- ♦ Hundreds of billions of galaxies make up the known Universe.
- ♦ Almost all these galaxies are clumped together in clusters or superclusters.
- ♦ Most galaxies appear to be moving away from us.
- ♦ The farther away from us the galaxy is, the faster it appears to move.



# The Universe



- ♦ Some astronomers believe the Universe began in an explosion called the Big Bang.
- ♦ According to this idea, all the matter and energy that makes up stars, planets, and galaxies grew from a point smaller than an atom to the size of a galaxy in a fraction of a second.



# The Universe

- ♦ The Bible teaches that God created everything in the Universe out of nothing.
- ♦ The Bible says that God spoke to create the wonderful things in our world.



- ♦ He created the Universe for Himself and for us.
- ♦ If there is life anywhere else in the Universe, God loves and cares for it just as He loves us.



# The Universe

- ♦ The vastness of God's Creation is sometimes difficult for us to comprehend.
- ♦ As more powerful telescopes are developed, we are discovering new frontiers in space.
- ♦ The more we learn, the more we realize how amazing God's Creation is.





# The Universe

- ♦ God said of Himself in Isaiah 46:9, “I am God, and there is none like me.”
- ♦ The more we study space and understand its amazing design, the more we can appreciate that there is no one like God.





# Review

1. What is space?
  - area beyond Earth's atmosphere
2. What are stars?
  - huge glowing balls of gas
3. What is an example of a star?
  - Sun
4. What is a telescope?
  - a long tube with a lens at each end to collect light
5. Who was the first person to use the telescope to look at the sky?
  - Galileo



# Review

6. What is a satellite?

- object that orbits another object in space

7. Are satellites natural or man-made?

- Both

8. What was the first space craft launched in space?  
Who launched it?

- *Sputnik 1*, the Soviet Union

9. Who were among the first space travelers?

- Yuri Gagarin and John Glenn



# Review

10. Who was the first person on the moon?

- Neil Armstrong

11. What are space probes?

- uncrewed vehicles that are used to collect information to send back to Earth

12. Who is included in a solar system family?

- planets and their moons, the dwarf planets and their moons, asteroids, meteoroids, and occasional comets



# Review

13. What is an astronomical unit?

- is the average distance from the Sun to Earth

14. How long is one AU?

- ~93 million miles

15. What are the planets in our solar system?

- Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune

16. What are the inner planets?

- first four planets are closest to the Sun: Mercury, Venus, Earth, and Mars



# Review

17. What are the outer planets?

- Last four planets are huge and made mostly of gases: Jupiter, Saturn, Uranus, and Neptune

18. What is the asteroid belt?

- a band of asteroids that orbit together between Mars and Jupiter

19. What are asteroids?

- chunks of irregularly shaped rock that orbit the Sun between the inner and outer planets.



# Review

20. What are dwarf planets?

- round bodies that orbit the Sun, they share their orbits with other space objects
- Ceres, Pluto, Eris

21. What are comets?

- small bodies made of lumps of rock, metal, and dust covered with ice

22. What is a galaxy?

- a huge system containing hundreds of billions of stars held together by gravity



# Review

23. What galaxy is our solar system in?

- Milky Way

24. What are the three main types of galaxies?

- Spiral galaxies, elliptical galaxies, irregular galaxies

25. What are clusters?

- Galaxies that move together in a group