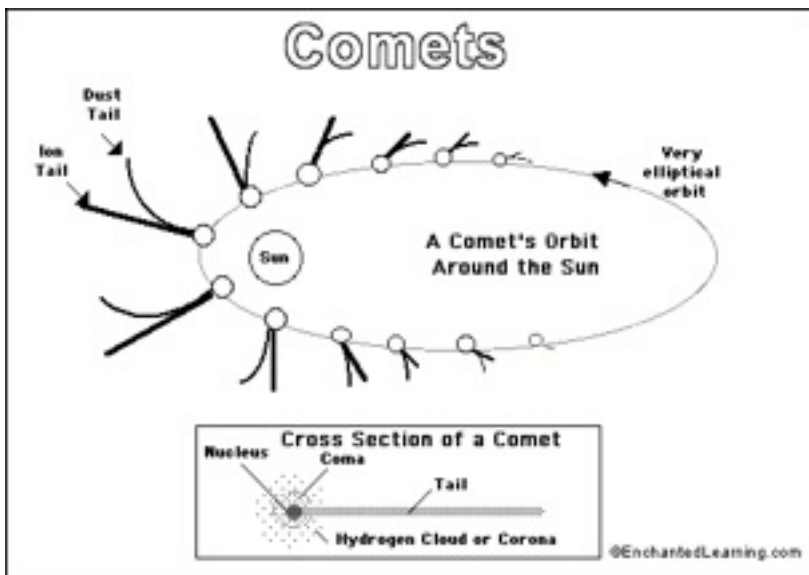
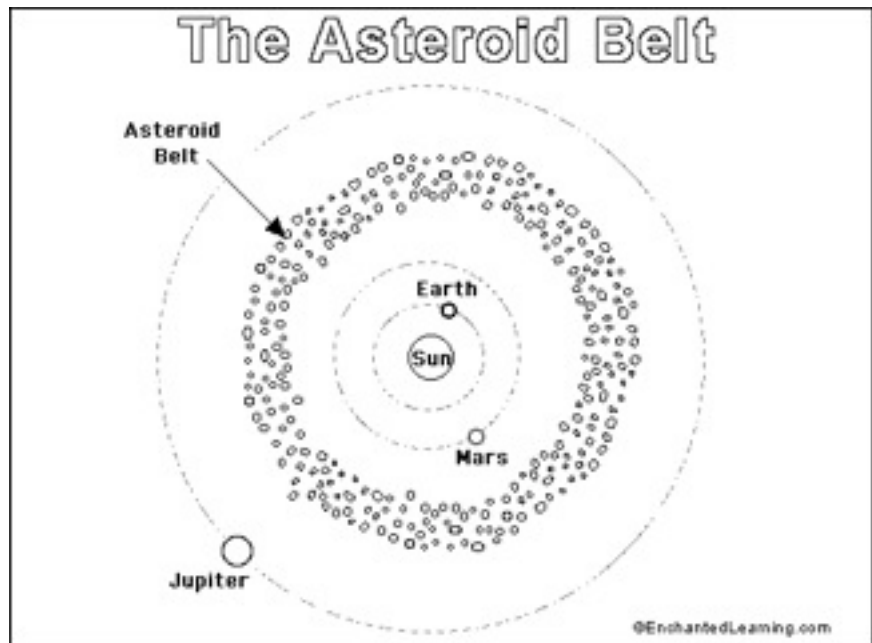


Other Objects in our Universe

So far, we have talked about the Planets, Earth, the Moon, the Sun and Stars. But there are other objects in our universe!

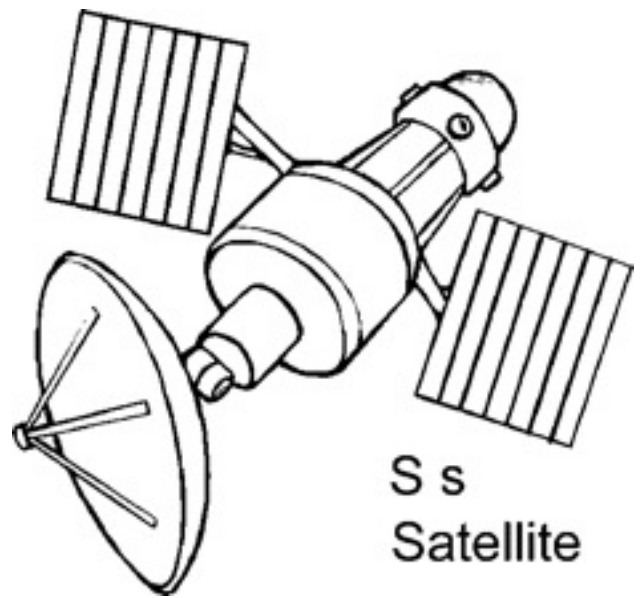
Asteroids: are minor planets (irregular shapes) located between orbits of Mars and Jupiter composed of rock and minerals (metals). There are 5000 identified.



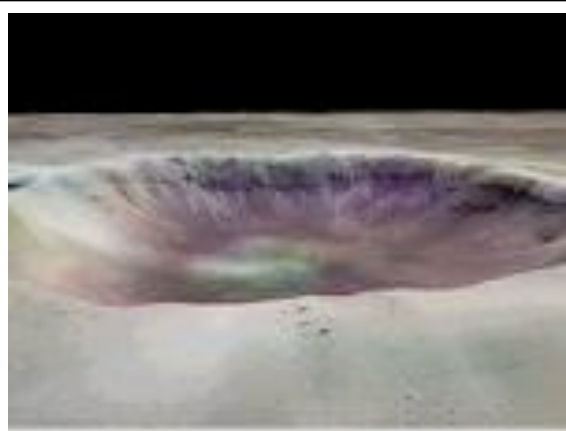
Comets: small celestial bodies that orbit the Sun (billions of these exist). They have bright bodies and tails that always point away from the sun because of the force of the solar wind. Comets are composed of dust and ice.

Theories today speculate that the comets that landed on early Earth brought water to the planet as well as organic molecules.

Satellite: a small body that orbits a larger one. ie. the Moon is a natural satellite of the Earth ie a communication satellite is an artificial satellite.



Meteors: solid body that enters the Earth's atmosphere from outer space, becoming hot and bright because of friction with the atmosphere. aka "shooting stars"



Meteorites: remnants of meteors that don't burn up completely and fall to earth. They are made of mainly stone or iron. They are very heavy.

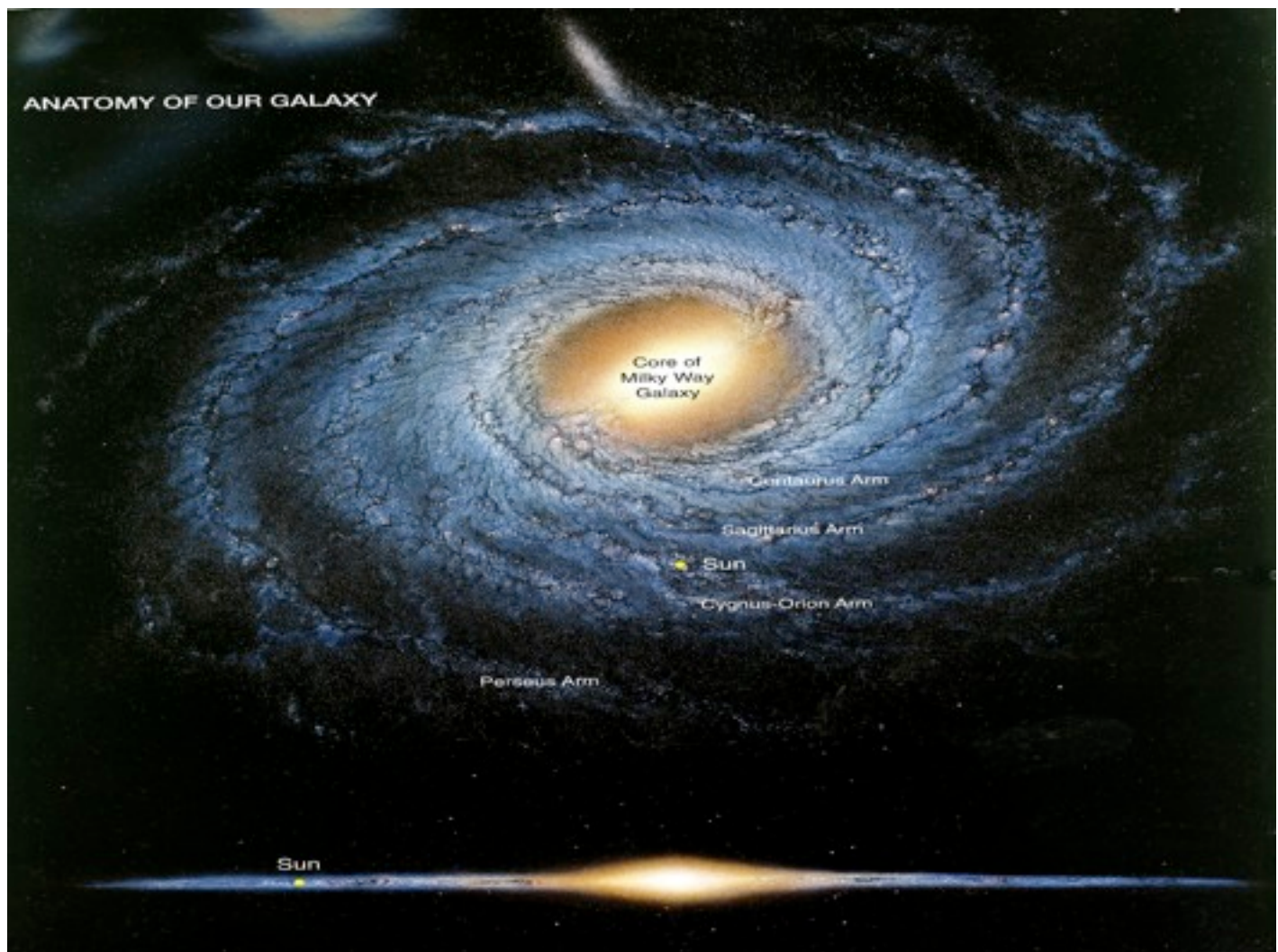
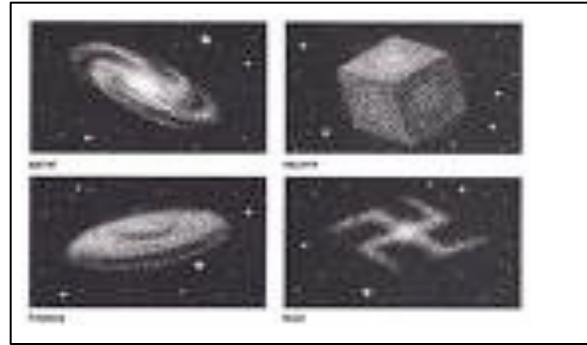
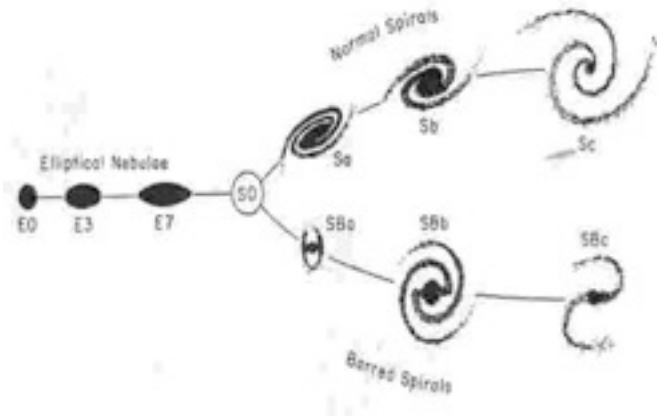


All of this stuff, combined with the stars, planets, moons combine to make up Galaxies!

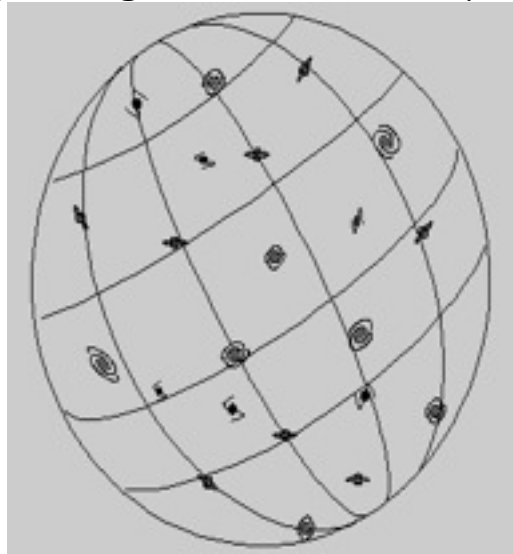
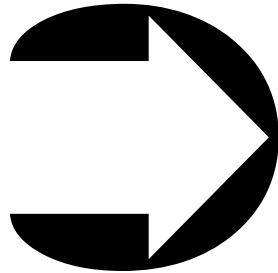
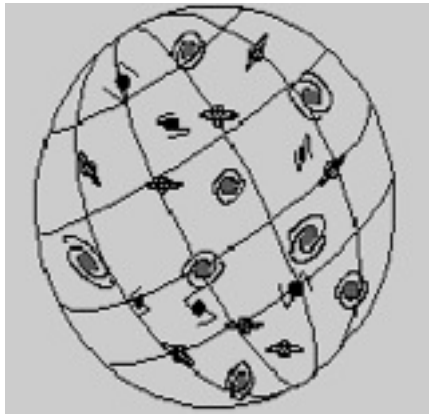
Galaxy: a huge accumulation of stars (millions to billions), gas and dust held together by gravity. The Sun and Earth (etc.) resides in the Milky Way galaxy seen as a hazy white band in the sky.

There are three types of galaxies

- a) Spiral b) Elliptical c) Irregular



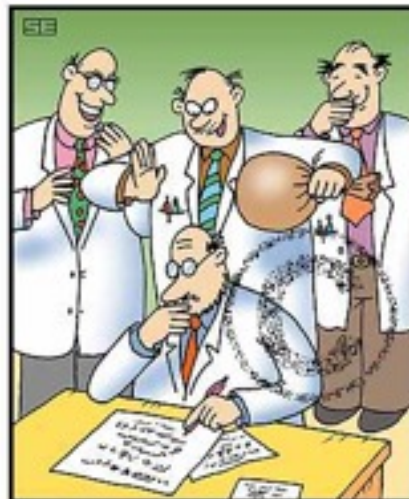
How the Universe Came to be: The Expanding Universe Theory



The galaxies are not getting bigger - the space between the galaxies is expanding. Every galaxy sees all other galaxies in the universe rushing away from it

Big Bang theory: a theory used to describe the formation of the universe. Theory states that there was a big explosion some 15-20 billion years ago that spread out and formed the first matter (atomic particles) that lead to the formation of all the objects in space.

A new theory involving "Dark Flow" is being investigated!



The favourite practical joke amongst Big Bang theorists.

Space Travel: A Short Timeline

- **1961** Russian Yuri Gagarin was the first man to travel into space.
- **June 1963:** Soviet cosmonaut Valentina Tereshkova was the First Woman in Space. She flew on the Vostok 5 mission which was launched on June 16, 1963. It orbited the Earth 48 times and the flight lasted 2.95 days.
- **July 20th, 1969** Apollo 11 crewed by Neil Armstrong, Micheal Collins and Edwin Aldrin)arrived on the moon. Neil Armstrong walked on the lunar surface. Famous saying "The Eagle has landed".
- The Space Shuttle was the first reusable spacecraft ever built. The first Space Shuttle was named Enterprise after the starship in "Star Trek". That ship never went into space. The first actual launch was on **April 12, 1981**, when the Columbia spent two days in space and returned home safely.
- **June 1983:** Sally Ride was the First American Woman in Space and third woman in space. She flew on the shuttle Challenger STS-7 mission from June 18-June 24, 1983.
- **October 1984:** Marc Garneau was selected to be the first Canadian in Space. He performed experiments on Space adaptation syndrome, the Space Vision System, how certain materials react to space exposure, a sun photometer, and recording a strange glow coming from the shuttle.
- **January 1986**, the space shuttle Challenger, disintegrated 73s after lift off as the O-ring seal in the right booster rocket failed at liftoff. This caused a flare that ignited the fuel tanks. All seven

crew members were killed. One was a civilian, a teacher, Christa McAuliffe who was selected to teach a lesson in outer space.

- **September 1992:** Dr. Roberta Bondar flew on the space shuttle Discovery to conduct scientific experiments in the first International Microgravity Laboratory
- **May 1999:** Susan Helms was the First Woman Crew Member of the International Space Station.
- **July 1999:** Eileen Collins was the First Woman to fly as a Space Shuttle Commander.
- **February 2003:** The Space Shuttle Columbia (107th flight) burned up on re-entry, killing all seven crew members.